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The Rise and Fall of the Nonconventional Mortgage Industry*

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Abstract

The 2007-2009 financial crisis was centered on the nonconventional mortgage industry. Scholars have just begun to carefully consider what really caused the crisis. This paper pushes the debate forward in several ways. First, we elucidate four different theoretical approaches, “financialization”, “actor-network/performativity”, “perverse incentives”, and ““markets as politics”” to understanding how the mortgage securitization industry evolved. We generate hypotheses and relevant data and show that the “markets as politics” approach accounts for the social structuring of the market from 1990-2008. Second, we use archival and secondary sources to show that the industry became dominated by an “industrial” conception of control whereby financial firms vertically integrated in order to capture profits at all points in the value chain. In 2004, the conventional mortgage market turned down. Financial firms entered the nonconventional market in order to keep their “industrial” conception going. The nonconventional market thrived for three years but when it turned down, the firms that went bankrupt were those who were the most committed to the “industrial” conception of control.

Introduction

It is generally agreed that the cause of the financial crisis in mid 2007 that produced a world wide recession was a result of the sudden downturn in the nonconventional mortgage backed securitization market in the U.S. (Aalbers, 2008; Ashcroft, and Schuermann. 2008; Arestis and Karakitsos, 2009; Demyanyk and van Hemert, 2008; Sanders, 2008). This downturn was caused by a fall in housing prices and a rise in foreclosures. This put pressure on the mortgage backed security bond market where massive numbers of bonds based on nonconventional mortgages were all of a sudden vulnerable to the possibility of default. Pressure, in turn, was placed on the holders of those bonds to raise large amounts of money to cover the money they borrowed to buy the bonds. Starting with the collapse of Bear Stearns and Lehman Brothers, the entire financial sector rapidly appeared to be in danger of sinking into bankruptcy. While there is general consensus that the nonconventional mortgage securitization meltdown was at the center of the financial crisis, most accounts of why the meltdown happened focus on the eventual collapse of the nonconventional mortgage market. In order to really understand what happened, it is necessary to make sense of how the nonconventional market rose, why the market for nonconventional mortgages expanded so quickly, and why banks entered that market so aggressively thereby leaving themselves vulnerable to the downturn in housing prices.

It is still very early for scholars to begin a systematic analysis of what happened. The purpose of this paper is to begin such an effort by seeing how some of the sociological and economic theories we have actually fit what happened (see Preda 2007, for a review of relevant theories). Most extant accounts of the mortgage backed securities (hereafter MBS) meltdown are either implicitly or explicitly grounded in larger theoretical perspectives on markets, either 1) “actor-network /performativity” theory, which locates the rise and fall of the mortgage securitization in ever more complex and abstract

modeling and financial engineering technologies (Callon, 1998; Knorr Cetina and Bruegger, 2002; MacKenzie and Millo, 2003; MacKenzie, 2009), 2) "perverse incentives", which views the economic behavior in terms of incentive structures and information asymmetries, and highlights the role of misaligned transactional incentives in the securitization process (Ashcroft, A. and T. Schuermann, 2008; Purnanandam, forthcoming), or 3) "financialization" theories, which view the crisis as a governance failure resulting from deregulation and the fragmentation of a financial system previously governed through large, integrated organizations and networks of embedded elites ((Davis 2009; Davis and Mizruchi 1999; Mizruchi and Davis, 2004; Krippner, 2005).

We show that the facts of the market structure of the sub prime MBS market are at odds with the "network-actor/performativity", "perverse incentives", and "financialization" hypotheses. We show that instead of the growth of nonconventional markets as being an instance of vertical disintegration and market fragmentation (Jacobides 2005; Davis 2009) that is implied by both the "financialization" and perverse incentives perspectives, it is instead a case of both vertical and horizontal concentration. We show that contrary to the common belief that banks passed on the risks of nonconventional MBS by selling them to others, the largest financial institutions increased their ownership of these securities dramatically from 2003-2007. We also show that the complexity of financial instruments did not contribute to the financial crisis by producing obscure financial instruments that were easy to overprice. Instead, we find no evidence that the more complex bond issuances were any more likely to be down rated by ratings agency in the face of the meltdown.

Instead, the evidence is most consistent with an alternative account of the mortgage securitization crisis based on Fligstein's (1996) "markets as politics" approach. "Markets as politics" provides a general framework for explaining both the evolution of markets and the behavior of firms within them. The basic tenets of the model are that actors work to reduce competition to stabilize their environments, and that this explains the both the structure of the firm and relations between firms.

When a market is emerging or transforming, the dominant actors settle upon a particular conception of control through which they can retain their dominant positions and stably make money. These conceptions shape the particular types of strategies and structures actors adopt. Shifting economic and regulatory changes can render existing arrangements dysfunctional, creating a crisis and leading firms to adopt new strategies (Fligstein 1996; 2001). The ""markets as politics"" approach focuses our attention on both the general tactics that firms will follow to create stable markets and a historical concern with identifying the emergence of new conceptions of control to structure those markets. The ""markets as politics"" perspective suggests that over time the tactics of market participants to control competition will encourage them to get bigger and more concentrated, get governments to intervene into markets on their behalf, and engage in tactics like vertical integration to control upstream supply of important inputs (Fligstein, 1996: 659).

Consistent with the ""markets as politics"" approach, we show that over time the largest banks became more and more integrated in the chain of production from the origination of mortgages to their ultimate sale as MBS. Then, we develop an account of why that structure emerged in the mortgage securitization industry. We identify, using archival documents and the secondary literature, the idea that banks began in the 1990s to view their business as not based on long term relationships to customers who would borrow and pay off their debts, but instead as fee based. This meant that banks were no longer interested in making loans to customers and holding the loans but instead were more interested in generating fees from various kinds of economic transactions. This was a response to the downturn in their core businesses of lending to long time customers. Then, we show that the banks began to develop an "industrial" model for their mortgage business. They realized they could collect fees from selling mortgages, from packaging them into MBS, from selling MBS, and from holding onto MBS where they could earn profits using borrowed money. This "industrial" model required the input of more and more mortgages in order to reap the benefits along the entire chain of production and

continued growth and profit. This vertically integrated "industrial" model was first perfected in the prime mortgage market. It worked spectacularly for financial institutions in the 1990s and first part of the 2000s.

But, it was the need to constantly find new mortgages that caused financial institutions to enter the nonconventional mortgage market with such force in 2004 when the market for conventional mortgages turned down. The crisis in the market in 2007 began as prices for houses began to fall and nonconventional mortgages began to default. This "exogenous" shock meant that the "industrial" strategy of vertical and horizontal integration in the mortgage markets, which had worked so well to produce enormous profits for banks, simply unraveled. Nonconventional mortgages and associated MBS which had performed favorably when the market was small became increasingly overrated after the large banks entered nonconventional origination and industrialized the MBS production process. We show using a logit analysis to show that firms which vertically integrated in nonconventional MBS were significantly more likely to fail in the wake of the meltdown.

In the next section, we consider what is to be explained. Then we pose some theoretical arguments that have been forwarded as explanations of the mortgage crisis. In the third section, we provide evidence to evaluate the claims of the various theories. In the fourth section, we articulate how the "industrial" model of the industry arose during the 1990s and 2000s. Then, we demonstrate the utility of the "markets as politics" approach by testing its ability to help explain two key facets of the crisis: bond overrating and firm bankruptcies. The results of multivariate regression analyses show that the "industrial" model, indexed by vertical integration in nonconventional MBS drove both deterioriation in the quality of securities and significantly contributed to the eventual bankruptcy of the firms which pursued the strategy.

What is to be explained?

Figure 1 provides a diagram illustrating the structure of the industry circa 1990. The emergence of this complex industry structuring has been documented in a number of places (Quinn, 2008; Barmat, 1990; Brendsel, 1996; Jacobides, 2005; Green and Wachter, 2005; Ranieri, 1996; Kendall, 1996). Circa 1990, the industry was separated into a set of markets that were organized on both a local and national basis. Borrowers who were trying to purchase homes would take loans from lending companies who in the jargon of the business are called originators. These originators could be local savings and loans, commercial banks, or specialized mortgage brokers. The originators would sometimes turn around and sell off the loans to "wholesalers" who would bundle the loans together. Originators could also sell the loans off to other banks or the government sponsored enterprises.

The government sponsored enterprises consist of the Federal National Mortgage Association (Fannie Mae), the Federal Home loan Mortgage Corporation (Freddie Mac), and a government owned corporation to insure those mortgages against risk of default, the Government National Mortgage Association (Ginnie Mae). These financial institutions, who would also sometimes make loans, would then package the loans into MBS either by themselves or with the help of an underwriter who was usually an investment bank. A mortgage backed security (MBS) is a bond that brings together a set of mortgages into a financial instrument where bondholders are entitled to part of the monthly payments that the mortgage holders make. These mortgage holders are generally residential property owners.

(Figure 1 about here)

The underwriters for bonds were all located in New York City. The underwriter would bring in a bond rating company (also located in New York City) to help them rate the bonds. Bonds were sometimes divided into "tranches" which allowed buyers to determine how much risk they wished to absorb. These products are called collateral debt obligations (hereafter, CDO). The tranches would then be sold to investors who consisted of insurance companies, pension funds, mutual funds, hedge funds,

the government sponsored enterprises, various commercial and foreign banks, and private investors. Finally, the borrowers would pay their monthly mortgage to a loan servicer who would act to disperse the funds to investors.

Throughout the 1990s, it was possible and indeed, common, for mortgage loans to pass through as many as 5 different kinds of financial institutions (originators, wholesalers, underwriters, government sponsored enterprises, and servicers) as they settled into the portfolios of investors. Many of these markets were fragmented by the types of financial institutions and regions of the country. The main concentrated entities were the government sponsored enterprises and the investment banks who acted as underwriters for MBS.

(Figure 2 about here)

Figure 2 shows that the market for mortgages increased from about $500 billion to over $1 trillion during the 1990s. After 2000, the market spiked dramatically to almost $4 trillion in 2003. It dropped to around $3 trillion in 2004 where it stayed for three years. Beginning in 2007 the market dropped to $2.5 trillion as the meltdown began and in 2008, it dropped to $1.5 trillion. The rise and fall of the mortgage market is apparent from this data. The 1990s market, while large and growing, was only a warm-up to what would happen during the 2000s. The 400% growth of the mortgage market from 2000-2003 (from $1 trillion to $4 trillion) shows explosive growth. This created a market opportunity for all banks to enter into the various parts of the mortgage business in order to secure fees from doing massive numbers of transactions.

Of even greater interest, is the growth of the nonconventional mortgage market from 1990-2008. Figure 2 provides a breakdown of the types of residential mortgages provided to borrowers in each year. It is useful to provide some insight into what prime and nonconventional mortgages are. To qualify for a prime or conventional mortgage, a person needed 20% down and a credit score of 660 or

above (the average score is 710 on a scale from 450-900). Mortgagees who did not have these qualifications were not eligible for prime or conventional mortgages. But, if they were willing to pay a higher interest rate, they could qualify for a set of mortgages that required more fees and higher interest rates. There are a set of categories of these loans that can be described as nonconventional or nonconforming. We will use the term nonconventional to describe all of these types of loans and reserve the term subprime for a particular type of mortgages. Here are the conditions that could qualify a mortgagee as subprime (what are called B/C mortgages because of their lesser ratings from bond raters): two or more loan delinquencies in the last 12 months; one or more 60 day loan delinquencies in the last 24 months; judgment, foreclosure, or repossession in the prior 24 months; bankruptcy in the past 5 years; a FICO score less than 660; and debt service to income ratio of 40% or greater (i.e. the monthly payment was more than 40% of the gross income of the household).

If one's credit was a bit better, one could qualify for what was called an "Alt-A" mortgage. Jumbo mortgages refer to mortgages where borrowers who may have had good credit had to borrow larger amounts of money than was conventionally allowed. The conventional limits to mortgages were provided by the government sponsored enterprises and were raised every year based on housing prices. Jumbo loans were frequently also given for luxury homes and in areas where prices had increased dramatically. Borrowers typically paid higher mortgage rates for Alt-A or jumbo loans. Home equity loans (HEL) refer to loans that people take out to borrow money on the increased value of their homes.

Figure 2 shows how the prime part of the market dominated the mortgage market during the 1990s. Almost 70% of the market every year from 1990 until 2003 was made up of prime loans. The really interesting thing to be explained is how the nonconventional part of the market grew dramatically in 2003-2004. As the total mortgage market shrunk in 2003-2004 from $4 to $3 trillion, the market that involved prime mortgages dropped from almost 70% of the market to about 33% of the market. The nonconventional sector went from a minor part of the market to a major part of the market

in a single year! Even more striking is how quickly the private banks (i.e. not Fannie, Freddie, or Ginnie) came to dominate the issuance of nonconventional MBS. Figure 3 shows that at the peak of the nonconventional market in 2004-2006, private banks issued almost $1 trillion of nonconventional mortgages as MBS.

(Figure 3 about here)

These descriptive data can be used to pose a series of questions, questions that require some theorization to explain. Who were the players in the mortgage securitization market during the 1990s and early 2000s and how did they respond to the opportunities to make massive numbers of house loans? What happened after 2001 to produce such explosive growth in the industry? Why did the nonconventional category expand so dramatically over time and in particular, during 2003-2004? What was the role of financial instruments in the growth of the market and the expansion of the nonconventional market? Finally what did the government do in this story to facilitate this vast expansion of the market and why did they not notice the incredible increase in nonconventional lending after 2003?

Theoretical Approaches and Empirical Predictions

Financialization

We use the term "financialization" to describe a set of authors whose work provides one way to understand the rise and fall of mortgage securitization, based on the historical transformation of American economic governance (Davis,, 2008; Davis and Mizruchi, 1999; Mizruchi and Davis, 2004). The premise of this account is that the growth of financial markets went hand in hand with the decline of large, integrated, and socially embedded manufacturing corporations who dominated the American economy through the 1970s (Davis, 2009). The largest American manufacturing firms, like General Motors and General Electric, created a world in the postwar era where tightly knit groups of locally

embedded elites of manufacturing executives, combined with interlocked directorates amongst large banking firms to form a relatively tightly coupled capitalist class. But, with the ongoing economic crises of the 1970s, these firms were forced to reorganize according to the logic dictated by the financial markets, what we now call "shareholder value" (Davis, 2009). This takeover of American business by the financial sector was not an assertion of authority by banks. During the 1980s, banking and finance increasingly became delocalized and market-mediated in several different ways (Davis and Mizruchi 1999; Mizruchi and Davis, 2004). Economic activities which had previously occurred either within organizations, within communities, or between tightly knit parties were transformed into market transactions between anonymous traders around the globe. Davis and Mizruchi (1999) describe this as the "center not holding" (1999).

The problem was that by re-centering financial activity outside of organizations and weakening old inter-firm governance networks, marketization eviscerated the institutional architecture which had previously served to stabilize these markets. Cultural orientations of the managers of the largest firms were now oriented toward short-term instrumental gains under the ideology of "increasing shareholder value", while the anonymity of market transactions promoted recklessness and a culture of limited liability (Davis, 2009). "financialization" meant there were no longer dominant firms or enlightened elite networks in a position to step in and assert a more systemically rational governance regime when the system started to destabilize in the current crisis, as capitalists had done during the 1930s crisis (Mizruchi 2010). In other words, the neoliberal project of liberalizing financial markets effectively disembedded financial markets from the social and regulatory systems which had previously stabilized them.

Krippner (2005) argues that "financialization" means that firms shift how they make money from being concerned with products or customers to being concerned with financial engineering. The financial markets as a result of their increased participation in the economy become larger and more

powerful in and of themselves. This means that finance takes over the economy and is one of its main sources of profits and growth. Krippner notes that during the 2000s, 40% of the profits in the economy were made in the finance, insurance, and real estate sectors of the economy where only about 10% of the people were employed.

Mortgage finance was at the center of this project (Krippner, 2010: Aalbers, 2008; Davis, 2009). From the mid 1980s onward, there was the general idea that all financial assets could become securities (i.e. be viewed as sources of cash flow based on the value of the underlying assets). The securitization of home mortgages began in 1970 when the federal government invented the tactic to expand the supply of mortgages (Quinn, 2008). It really took off in the mid 1980s when the savings and loans banks collapsed (Lewis, 1990; Kendall, 1996). By 1990, mortgage securitization became a standard technique to change mortgages from a local loan given by a bank to a customer that was held by the bank for as long as the customer owned the house to a security whereby the original lender no longer held the mortgage.

This process of changing the way mortgages were handled was accompanied by a general fragmentation of the banking industry. Davis (2009:116) describes how this process affected the structure of the mortgage industry:

> "But securitization also provided another way to avoid banks, by dividing up the value chain into free-standing providers. In the mortgage market, the large majority of home buyers went to brokers rather than bankers for loans by the early 2000s, and these brokers often dealt with free-standing mortgage firms rather than banks. Originating loans, servicing them, and buying them- functions traditionally bundled together in a single bank in the "wonderful life model"-could be bundled and performed by specialist firms."

The main perspective on the nonconventional market from this point of view, is the opportunism of originators to focus on poor and less qualified buyers as the market grew. Since originators did not hold onto mortgages, but instead sold them off to the government sponsored

enterprises or underwriters to be turned into MBS, they were not interested in the underlying creditworthiness of their buyers (see Davis, 2009: 222-228; Aalbers, 2008: 158-160).

This leads up to the following hypotheses:

Hypothesis 1: As the mortgage markets grew, the markets for origination, packaging, selling, holding, and servicing MBS became less concentrated as multiple players entered the markets.

Hypothesis 2: Nonbank financial intermediaries account for more and more of the players in these markets over time as other banks remove themselves from the markets.

Hypothesis 3: The nonconventional mortgage meltdown is caused by the proliferation of smaller more aggressive originators who take advantage of poor people and unqualified buyers as they pass on the risks of these mortgages to other players down the line.

Perverse Incentives

The basic idea of our second perspective, is that misaligned incentives and information asymmetries between the sellers and buyers of MBS encouraged the former to sell off risky assets down the line thereby encouraging them to take on risks that they would not have to bear (Purnanandam, forthcoming; Ashcroft and Schuermann, 2008). This point of view offers an explanation of the crisis that is partially similar to the "financialization" perspective; i.e. the tendency of originators to pass on the risks of mortgages to firms down the line. This works in the following way. Originators who sold mortgages on to wholesalers or other banks were thought to lower underwriting standards on the part of mortgage lenders since they had no interest in the borrower's long-term ability to repay. These firms would then sell risky mortgages to MBS issuers who would package them into securities. MBS issuers would have no intention in holding onto MBS, but instead create MBS to sell to investors.

This created an incentive for MBS issuers to approach a credit ratings agency to assign the highest possible credit rating for each tranche. They would shop for ratings from the credit ratings firms in order to get the highest ratings. The credit ratings agencies were paid by the MBS issuer. This put the credit rating agencies in the position of having to inflate ratings to satisfy their customers (the

issuers), who would otherwise take their business elsewhere. The result was that issuers were able to bid up the ratings for their securities. Proponents of this explanation point to the fact that so-called shopped (i.e. solicitied) ratings for a given security tend to be higher than unsolicited ratings (Benmelech and Dlugosz, 2009). From this perspective, the nonconventional mortgage crisis was caused by the fact that at every point along the chain, no one had any incentive to care about the credit worthiness of the original mortgagee. Economists argue it was through this string of perverse incentives that individually rational behavior produced the collectively irrational outcomes which culminated in the meltdown (Purnanandam, forthcoming; Ashcroft and Schuermann, 2008).

Hypothesis 4: Market participants focused their attention on one part of the market in order that they would pass the risk on to firms down market.

Hypothesis 5: Market participants who were originators or underwriters did not hold onto mortgage backed securities as they passed the risk off to others.

Hypothesis 6: Ratings agencies tended to over rate bonds in order to please underwriters and keep their business. As the nonconventional mortgages became more prevalent, there was pressure to over rate these more risky bonds "AAA".

Instrument Complexity

The actor-network theory/performativity approaches within economic sociology would explain the sources of the crisis by examining the evolving technologies of financial engineering and securitization, specifically the increasingly complex instruments through which mortgage debt was securitized. While their explanations are not mutually exclusive from the other approaches, this approach focuses explanatory attention on the technology of financial instruments over the strategies of financial actors and the market structure in which they compete. Mackenzie, a proponent of this viewpoint, writes that "The roots of the crisis lie deep in the socio-technical core of the financial system (2009: 10)."

An "actor-network/performativity" approach focuses on the role of credit collateralized debt obligations (CDO) in creating the crisis (Tett, 2008). As we discussed earlier, mortgage CDO are a type of MBS whose value and payments are based on the underlying mortgages. They differ from MBS in that CDO securities are MBS that are split into different risk classes, or tranches. The senior tranches are the safest as they continue to receive payments from the underlying mortgages in the pool even if many of the mortgages default or are paid off. The less highly rated tranches offer higher payments to compensate for their higher risk. CDO allowed buyers of MBS to choose both their level of bond rating but also their risk and returns. One line of argument has been that as the instruments grew more complex, they were less easy to understand. This meant that buyers increasingly relied on bond ratings to know what level of risk they were purchasing.

This meant the role of bond raters in this process became more important. Bond raters, even if they were trying to be honest, built models evaluating the underlying risk of nonpayment for nonconventional mortgages using historical data. One variant of the complexity argument is that these models were ultimately flawed and risk was simply underestimated. This would imply that credit ratings would simply be too high. Another argument focuses on the complexity problem as it intersects with the incentive problem. Skreta and Veldkamp (2009) show that as bonds become more complex, even reasonable ratings will diverge based on the different premises of ratings' models. In this situation issuers have an incentive to "shop" for the highest rating, which over time will produce systemic bias even in the absence of individually biased ratings on the part of credit rating agencies. Through this mechanism, Skreta and Veldkamp argue that the increasingly complex *composition* of mortgage-backed instruments –specifically the increasing number of CDO – played a significant role in driving ratings inflation over time, masking the true riskiness of the underlying assets.

If the "actor-network/performativity" perspective is correct and the evolution of financial technologies is the operative explanatory factor in the financial meltdown, then more complex MBS

should have been more prone to experience credit markdowns. One way to empirically test the complexity arguments is to examine how the credit performance of CDO differed from more conventionally-structured nonconventional MBS assets. If complexity arguments are correct, ratings inflation should be most pronounced amongst the most complex instrument classes (CDO), and/or CDO heightened riskiness should be evident in more severe ex post credit downgrades.

Hypothesis 6: CDO should show more ratings inflation than conventional MBS.

Hypothesis 7: CDO should be downgraded more after the crisis began as their opaqueness came back to haunt their holders who then went on to suffer greater losses.

"Markets as politics"

The "markets as politics" approach offers both a set of generic ideas about how markets arise and a more specific analysis based on the conception of control that dominates the market (Fligstein, 1996; 2001). Generally, the "markets as politics" approach focuses on the types of strategies firms adopt in order to mitigate the effects of competition. It argues that governments will play a role in the constitution of markets as well. In the case of the mortgage markets, the "markets as politics" approach would begin with the market structure in the 1990s and ask how that would have changed over time. Moreover, the "markets as politics" approach would also view the rapid expansion of the nonconventional part of the market as a case whereby the market might have been invaded and taken over by firms in the conventional mortgage market. It is useful to expand these arguments.

In general, stable markets take on an incumbent/challenger structure whereby large firms come to dominate markets by controlling competition through market share and control over scarce resources. In the case of mortgage markets, we ought to expect that over time as these markets grew, firms will get larger market share and that they might want to preserve their position by vertically

integrating production (Fligstein, 1996). We might also predict that firms will seek out government help in allowing them to control markets.

This suggests a number of hypotheses:

Hypothesis 8: Over the time period 1990-2008, we would expect market shares for financial institutions in these markets to increase in order to control the market.

Hypothesis 9: Over the time period 1990-2008, we would expect that financial institutions might vertically integrate in order to control the market. This would cause underwriters to enter the loan origination business and originators to enter the underwriting business. This is because underwriters need to guarantee themselves a set of mortgages to package into MBS and originators might want to take advantage of the fees generated from the underwriting business.

Hypothesis 10: We predict that financial institutions in the conventional sector would invade and takeover the nonconventional sector as the opportunities to make nonconventional loans increased and the amount of conventional loans decreased.

Hypothesis 11: We ought to observe incumbent firms trying to get the government to protect them by creating market rules that favor them.

The "markets as politics" approach would also be interested in the conception of control adopted by the banks. This idea suggests that if one can identify what that conception of control is, one can then make hypotheses about the behavior of market participants. Conceptions of control are cultural understandings by principal market actors about how they make money. In the case of banks, we argue that during the 1990s, the banks changed their underlying conception of control. Banks grew large in the past by having stable relationships to their clients. During the 1990s, this client based model broke down as bank clients moved away from banks and towards other financial entities for many of their banking needs. This caused banks to evolve a fee based business where their main way of making money was off of charging fees to a large number of customers. The mortgage business is a classic fee generating business. Fees are charged to arrange the loan to a home buyer, selling that mortgage to as wholesaler or underwriter, turning the loans into MBS, selling the MBS to customers, and servicing the underlying mortgages in the MBS packages. Banks began to realize during the 1990s

that the fee based model meant that if banks controlled the entire pipeline from origination to servicing, they could capture fees at all points in this process. This is a kind of industrialization of the mortgage process.

The evolution of this model changed the behavior of banks all along the chain of markets. Banks worked to have regulators rescind the Glass-Steagall Act which meant that banks could enter into all of these businesses. Investment banks also worked to get regulators to allow them to take their holdings of MBS off books in 2003-2004 in order that they could profit off of low interest rates after 2001. Finally, banks that were making their money from all parts of the industry were particularly aggressive in expanding into nonconventional mortgages. These banks relied on the fees generated at all parts of the chain. In 2003, the size of the conventional mortgage market dropped dramatically. This caused vertically integrated firms to have to find a new market. That market was the nonconventional market which they entered into with a vengeance.

This leads up to our final hypotheses:

Hypothesis 12: Over time, we expect that more mortgages will be packaged into MBS as banks attempt to generate more fees by originating loans, packaging them into MBS, selling them, and holding onto them.

Hypothesis 13: Banks that were involved in three or more parts of the mortgage business were more likely to enter the nonconventional business after 2003 and increase their market share.

Hypothesis 14: Banks that were more vertically integrated were more likely to be exposed to the risks of the nonconventional market and more likely to go bankrupt.

Our "test" of these hypotheses requires a variety of kinds of data. While a few of the hypotheses are contradictory in their predictions, many of the hypotheses point out very different features of the prime and nonconventional mortgage industries over time. One way to understand this is that the theories are observation laden; i.e. they suggest very different things to observe. So, for example, the "actor-network/performativity" perspective makes no hypotheses about the firms or their strategies

over the period while the ""markets as politics"" perspective makes no hypotheses about CDO bond ratings. It is the case, for example, that hypotheses from the different perspectives may be confirmed when one looks at the relevant data. This implies that figuring out ultimately how the stories fit together in a synthetic way is the next step in the analysis (something we take up in the conclusion). Rather than proceed to a formal Data and Methods section, we have placed relevant information on measurement in an Appendix. We will instead interrogate the history of the markets involved in mortgage securitization from 1990 until 2008 and relevant data in order to arrive at a test of the hypotheses.

The Market Structure of the Prime and Nonconventional Markets, 1990-2008

A useful place to begin is by examining the structure of the industry over the period. Clearly, our theories greatly diverge in their imagery of who the players were in each segment of the industry and how these change over time. Both the "financialization" perspective and the "perverse incentives" perspective imply the industry is fragmented along separate products and in parts that are not concentrated. The "markets as politics" perspective implies that over time we ought to expect the markets to integrate both vertically and horizontally as the markets expand and competition heats up.

(Figure 4 about here)

There was a general concentration of financial assets going on during the 1990s across the largest financial firms. Kaufman (2009: 100) shows that between 1990 and 2000, the 10 largest financial institutions increase their share of assets from 10% to 50%. Figure 4 presents data on the top 25 mortgage lenders and the top 25 nonconventional lenders (originators) from 1991-2008. In 1991, the mortgage lending industry was relatively unconcentrated. The 25 largest lenders only made up about 30% of the total amount lent. This supports the view proposed by both the "transaction cost" and "financialization" perspectives that the market was not dominated by a few firms. However, the market

began to concentrate consistently for the next 18 years ending up with the top 25 lenders having 90% of the market. The nonconventional market has a shorter time series only beginning in 1996. Here the top 25 firms accounted for 48% of the market. This number rose steeply over the next 7 years to over 90% share for the top 25 firms. This rapid concentration in the nonconventional market implies that the mortgage origination industry was not fragmented and local in its scale. Instead, over time the industry became more and more concentrated, consistent with the ""markets as politics"" prediction.

(Figure 5 about here)

The next issue to explore is the vertical integration of banking activities. Figure 5 presents data on the market segments of the 25 largest banks that were nonconventional originators from 2002 through 2006. Figure 6 shows that as late as 2002, almost 70% of the banks were in only one or two segments of the nonconventional market. By 2006, almost 50% of the banks are in three or four markets and over 80% were in two or more markets.

The integration of banks in the nonconventional market could be due to two forces. First, banks already present in the market could be entering into more activities. Alternatively, the nonconventional market could be in the process of takeover by larger banks who were already involved in a number of market segments. It is useful to consider the evidence on this point. Figure 6 presents data on the percentage of the 25 largest financial sector firms who were in the nonconventional mortgage market. In 1998, only 24% were in the nonconventional market. But 2004, this had risen to 56%. This figure suggests that there was an invasion of the nonconventional mortgage market by the largest financial firms during this period. These firms tended to be in more than one market segment. This pattern is consistent with hypothesis 10 and the "market as politics" view that the nonconventional market was invaded by financial firms who were operating in a number of market segments.

(Figure 6 about here)

Readers will recall from Figure 2 that during most of the 1990s, the nonconventional part of the market was small relative to the entire mortgage industry. While that market was expanding throughout the decade, it was only about 30% of the total market. After 2000, the nonconventional share of the market grew and in 2004, the nonconventional part of the market was now the majority of the housing market. Given that we have shown that the largest financial institutions entered the nonconventional market in mass between 1998 and 2004, it is useful to consider who these firms were. Figure 7 shows that in 1996, most of the firms operating in the nonconventional sector were either small regional banks or financial institutions that specialized in lending to people with less money (in line with the "financialization" perspective). ContiMortgage, Long Beach Mortgage, and United Co. were examples of the former while Household Finance, the Money Store, AMRESOS, and Beneficial were all examples of the latter. In 2007, both the origination and underwriting businesses in the nonconventional market had been taken over by large commercial banks and investment banks. Citibank, Countrywide, Wells Fargo, Chase, and Washington Mutual were all amongst the largest commercial banks in the U.S. Merrill Lynch, Morgan Stanley, Lehman Brothers, and Bear Stearns were all investment banks. This shows quite clearly the transformation of the nonconventional market from a small market dominated by specialist firms to a large market dominated by the core commercial and investment banks.

(Figure 7 about here)

Hypothesis 12 suggests that another measure of the industrialization of the mortgage industry was the degree to which all mortgages were being securitized. In the world of the early 1990s, when smaller and regional banks still dominated the various parts of the mortgage market, one would expect that there were still companies that made loans directly to consumers and held onto them. While the savings and loan industry was in decline by this period, there were still a substantial number of mortgages held directly by these banks. Figure 8 presents data on the rate of mortgage securitization for

prime and nonconventional loans from 1995 until 2007. Nonconventional loans are securitized at a relatively low rate of 25% in 1995. The rate increases over the period to almost 90% by 2007. A similar pattern can be observed for prime or conforming loans (although these loans start out at a higher level of securitization). This implies that the mortgage chain we described earlier was becoming more integrated as originators did not hold onto mortgages but had them packaged into MBS.

(Figure 8 about here)

Finally, both the "financialization" and "perverse incentives" perspectives take the view that banks did not hold onto the MBS they issued. Figure 9 shows quite clearly that from 2002-2007, all of the major players in the mortgage market increased substantially their holdings in MBS. Commercial banks, investment banks, mutual funds, and foreign investors all increased their holdings of MBS as the market grew and shifted towards nonconventional mortgages.

(Figure 9 about here)

It is useful to consider the implication of these results for our understanding of the nonconventional mortgage securitization crisis and the various theories. First, it is clear that while the "financialization" and perverse incentives" perspectives provide an accurate description of the mortgage market circa 1993, they fail to understand what happened in the market subsequently. The largest participants in the mortgage market grew more concentrated in their market shares, integrated their activities into other parts of the market, and entered the nonconventional market aggressively in the early 2000s. It is the case that as the number of mortgages sold in the U.S., the number that was securitized increased constantly across the period as well. This implied that market players saw securitization as a way to make money and used the increased number of loans as a reason to increase the numbers of securities. Finally, at the end of the period, all of the financial firms involved in any part of this market increased their holdings of MBS dramatically from 2002-2007. Hypotheses 3 and 5

associated with the "financialization" and perverse incentives perspectives are wrong. The perspective that is most consistent with these changes is the ""markets as politics"" perspective. As these markets grew in size, the largest financial entities grew as well and expanded their activities both upstream to originate loans, downstream to package them into MBS, and finally into the nonconventional market.

The Transformations of the Banks, 1990-2001

The data we have presented on the structuring of the prime and nonconventional parts of the market are most consistent with the account given by the ""markets as politics"" perspective. Instead of a fragmented industry where actors opportunistically produce, package, and pass on mortgages and MBS, the image we have is of a vertically integrated industry dominated by a small set of players who made off money off of each stage in the process. But, this account is incomplete, in the sense, that it does not flesh in how the actors saw what they were doing and who the actors were. It is useful to consider the changes in the conception of control in banking during this period by examining some of the secondary literature and some archival sources.

Davis and Mizruchi (1999: 219-220) show that from 1970-1990 commercial banks lost more and more of their core lending markets to other financial entities. Corporations stopped going to banks for loans and instead went directly to the financial markets to raise money. Consumers stopped putting money in banks to save and began to invest in money market funds, certificates of deposit, and a wide variety of stock and bond mutual funds. This took depositors away from banks and meant that they were not able to easily raise capital. So-called nonbank banks like GE Capital made "industrial" loans while the financial arms of the automobile companies, like GMAC took over the auto loan business. In the mortgage business, as we have already seen, mortgage brokers and lenders ate into the business of savings and loans and other banks (Kaufman, 1993). Dick Kovacevich, CEO of Norwest, a large

regional commercial bank said “The banking industry is dead, and we ought to just bury it” (James and Houston, 1996: 8).

In response to these changes, commercial banks began to search out other market opportunities. They began to look in two directions. First, they wanted to be able to enter more lucrative businesses such as investment banking, the buying and selling of stocks and bonds, and the insurance industry. This brought them to favor the end of the depression era legislation that limited their activities, the Glass-Steagall Act. Their central argument was that the changes in banking had led to an erosion in the lines of banking business. From the mid 1980s until its repeal in 1999, the commercial banks led a push to expand their activities and undermine the legal strictures that kept them out of lucrative businesses (Hendrickson, 2001; Barth, et. al., 2000). The Federal Reserve (the chief regulator of commercial banks) did everything it could in this era to change regulation to allow the commercial banks to enter other businesses (Hendrickson, 2001). In 1998, Citibank bought Traveler’s Insurance (a company that not only sold insurance but was also a brokerage firm and owned an investment bank) in anticipation that the Glass-Steagall Act would be repealed. The Clinton Administration united with Republicans in Congress to de-regulate the banking industry in the Gramm-Leach-Bliley Act of 1999. This led to a flurry of bank mergers and the creation of large firms which no longer saw themselves as banks but as financial services firms (Hendrickson, 2001; Barth, et. al., 2000). We note that this intervention on the side of the largest banks to increase their ability to enter new markets is consistent with both the “financialization” and “markets as politics” perspective.

The second important change in the industry was more subtle. The new financial services firms, and in particular, the commercial banks began to see their industries as not about giving customers loans, but about charging fees for services. DeYoung and Rice (2003) document these changes across the population of commercial banks. They show that in income from fee related activities increases from 24% in 1980 to 31% in 1990, to 35% in 1995, and 48% in 2003. This shows that commercial

banks were moving away from loans as the main source of revenue by diversifying their income streams well before the repeal of the Glass Steagall Act. The largest sources of this fee generation in 2003 were (in order of importance) securitization, servicing mortgage and credit card loans, and investment banking (DeYoung and Rice, 2003: 42).

This increased attention to securitization and mortgage servicing was accompanied by a huge growth in their loan portfolios of real estate loans. DeYoung and Rice show that banks did not just shift towards a fee generating strategy, but instead shifted the focus of their investments. Instead of directly loaning money to customers, banks would either sell mortgages or package them into MBS. They would then borrow money to hold onto the MBS. Commercial banks' real estate loans represented 32% of assets in 1986, increasing to 54% of assets in 2003. Why did this happen? They did this because holding onto the MBS was where the money was made. Mortgage Servicing News (2005) estimated that mortgage origination accounted for 10% of the profit on a real estate loan, while holding the MBS accounted for 70% and servicing the loan accounted for 20%. By 1999, Bank of America, Citibank, Wells Fargo, and J.P. Morgan Chase, the largest commercial banks all had shifted their businesses substantially from a customer based model to a fee based model where the end point was for customers' loans to disappear into MBS. Not surprisingly, all four were amongst the leaders in businesses located in all parts of the mortgage market.

The deregulation of financial services did not just provide commercial banks with the opportunity to enter into new businesses. It also allowed other financial firms to expand their activities as well. While the boundaries between financial industries were clearly eroding from the 1980s on, after 1999 with the repeal of Glass-Steagall, any financial firm could feel free to enter any financial industry. The real estate market was a potentially huge opportunity for all sorts of financial services firms. The potential to earn fees from originating mortgages, securitizing mortgages, selling mortgages, servicing mortgages, and making money off of MBS were enormous. Countrywide Financial started

out as a mortgage broker and Washington Mutual Bank (a savings and loans bank) both rapidly entered into all parts of the mortgage business during the 1990s. On the investment bank side, Bear Stearns, an investment bank, entered the mortgage origination business by setting up lender and servicer EMC in the early 1990s. Lehman Brothers, another investment bank bought originators in 1999, 2003, 2005, and 2006 (Currie, 2007). Both GMAC and GE Capital moved after 2004 into the nonconventional mortgage origination industry and the underwriting of MBS (Inside Mortgage Finance, 2009). During the nonconventional mortgage boom, Morgan Stanley, Merrill Lynch, and Deustche Bank all bought mortgage originators (Levine, 2007).

The vertical integration of production was spurred on by the desire of banking entities to control the mortgages from the point of origination to their ultimate sale. Anthony Tufariello, head of the Securitized Products Group, in a press release distributed when Morgan Stanley bought Saxon Capital suggested that:

> "The addition of Saxon to Morgan Stanley's global mortgage franchise will help us to capture the full economic value inherent in this business. This acquisition facilitates our goal of achieving vertical integration in the residential mortgage business, with ownership and control of the entire value chain, from origination to capital markets execution to active risk management." (2007)

Dow Kim, president of Merrill Lynch's Global Markets Investment Banking group made the very same point in announcing the acquisition of First Franklin, one of the largest nonconventional originators in 2006:

> "This transaction accelerates our vertical integration in mortgages, complementing the other three acquisitions we have made in this area and enhancing our ability to drive growth and returns." (2006)

By the turn of the 21st century, the mortgage backed securities business was increasingly dominated by a smaller and smaller set of players. The largest commercial banks, mortgage banks, and investment banks extended their reach both backwards to mortgage origination and forwards to underwriting and servicing. Their ability to make money at every stage of the process by capturing fees

meant that the three markets were no longer separate. They had been combined into a single market with players vying for opportunities at all parts of the market.

The MBS and CDO industry 2001-2008

The government sponsored enterprises (GSE) were the mainstay of the prime mortgage market throughout the 1990s and into the 2000s. The standard model of the mortgage market for conventional loans circa 2000 was that a mortgage originator would sell the mortgage to one of the GSE. The GSE would then purchase the services of an underwriter to turn the mortgages into MBS. The GSE would then either sell the MBS or hold them in its own account. Frequently, the GSE also used outside servicers for their loans when packaged. Many of the banks that did business with the GSE were the large commercial banks. They would sell the mortgages they had originated to the GSE, and then act as an underwriter for the bond process. They would then frequently buy the MBS and hold onto to them in their own investment portfolio. They would borrow money to buy those bonds thereby freeing up their money to go out and make more loans.

An astute reader would wonder why the banks sold their loans to the GSE at all. After all, if the purpose of vertically integrated production of MBS was to make fees, bringing in a middleman would dilute those fees. To understand why some fees were foregone, one needs to understand the role of the GSE in the market. The GSE essentially served two purposes in the market. First, by buying the mortgages and packaging them into MBS, the eventual buyers of the bonds felt that at the end of the day, the federal government stood behind the integrity of the bonds (Ranieri, 1996). This meant the bonds could get high bond ratings (AAA often) because it was assumed that if some problem ever arose, the federal government would bail out the GSE. Second, by buying back the bonds from the GSE, the commercial banks and other entities that held the bonds could borrow money more cheaply to hold onto them, and have much less risky looking overall asset portfolios. In essence, the GSE

performed the magic act of turning mortgages with varying degree of riskiness into almost riskless investments that could be financed with money borrowed on the best terms.

In 2001, the mortgage market began to take off. It increased from a $1 trillion a year market in 2001 to an almost $4 trillion market in 2003. Why did this happen? Almost all observers of this market argue that the main cause was the low interest rates put into place by the Federal Reserve in the wake of the stock market meltdown. These low rates had two related effects. First, given the low interest rates, bond prices for the safest investments, U.S. treasury bonds fell to very low levels. Investors in the U.S. and around the world were looking for a safe way to earn more than 1-2% on their money. If they could find a safe investment with a higher return, they would clearly be attracted. Second, given how low interest rates had dropped, anyone in the U.S. who had a mortgage looked very seriously at either refinancing the mortgage or buying a new house.

The mortgage securitization business was perfectly placed to take advantage of this opportunity. They had a business model built on high throughput of mortgage originations that went all the way to selling MBS to customers. The low interest rates provided them with the high octane fuel they needed to accelerate this process even more. At one end of the process, low interest rates brought in the customers to refinance and buy new houses. At the other, low interest rates allowed them to sell MBS to financial investors looking for a higher return. Indeed, the low interest rates had one other effect on most vertically integrated firms. They could borrow money cheaply and turn around and invest that money in MBS. If they borrowed money at 2-3%, and held MBS that paid out 6-7%, they could make payments on their loans and essentially make money on the difference. This explains why during the 2002-2007 period, the numbers of MBS held by all financial investors except for the GSE increased dramatically during the period.

There was one problem with this model. In order for investment banks to do what commercial banks were doing i.e. borrow money to buy MBS, they needed to have an arcane accounting rule changed. Investment banks were limited in the amount of reserves they needed to hold as a cushion on their investments. If they borrowed substantially to buy MBS, then they needed to have more cash on hand to back up their debts. The five investment banks, led by Henry Paulson, Jr. then the CEO of Goldman Sachs and later the Bush Administration Treasury Secretary who would lead the bank bailout, descended on the SEC on April 28, 2004. They argued that the rule should be relaxed in order that they might use their capital more efficiently. They claimed that they would use credit default swaps to hedge against the risk of default on the MBS they held. Basically, the argument was that the credit default swaps were a form of insurance. The SEC agreed to this change with little discussion (New York Times, September 24, 2008 and September 24, 2008).

Why was this change so important? We now know that the investment banks went on a wild spending spree whereby they increased their holdings of MBS dramatically (see Figure 9). We also know they did this mainly by borrowing, what is called "leveraging". This meant that they did not increase the amount of capital they held in reserve at all, but dramatically increased their borrowing and holding of MBS. While this is well known, the question that this process begs to answer, is why did the investment banks and everyone else want to go so wholeheartedly into the nonconventional market in particular?

The Supply Crunch and the Move to Nonconventional Mortgages

After a record year in 2003, the mortgage origination industry experienced a supply crisis in 2004. Figure 3 shows total yearly mortgage originations by type. The 2004 dropoff in new mortgages was severe, with monthly origination volumes *declining over 70%* from $200 billion in August 2003 to under $60 billion a year later. Several factors were at play, including a slight uptick in interest rates

from their historic lows. But the foremost cause was the simple fact that the prime market had already been saturated during the 2003 refinancing boom. Of the $3.8 trillion of new mortgages written in 2003, $2.53 trillion, about two thirds, was attributable to refinancings as owners cashed in on low rates. The drop in mortgage originations posed a major lack of mortgage supply posed a major source of concern for industry actors.

Stock analysts demanded continued profit growth, and bank executives continued to demand the fee revenue production from their structured finance departments, which accounted for an ever-larger share of firms' profits (Tett 2009). Originators had grown their operations and needed new markets for their suddenly excess capacity As an editorial in the Mortgage Bankers Association trade newsetter wrote:

> Mortgage originators who geared up their operations to capitalize on the boom now face a dilemma. Given a saturated conforming market that is highly sensitive to interest rates, where can retail originators turn for the new business they need to support the organizations they have built? (Mortgage Banking, May 01, 2004).

As Barclays Capital researcher Jeff Salmon noted in May 2004, “The recent dearth of supply has caught the market off guard. Aside from the bellwether transactions from Capital One and GMAC, overall supply has been less than people had expected for this time of year"’ (Asset Securitization Report, May 17, 2004). If the industry was to keep the mortgage securitization machine churning, actors would need to somehow engineer new sources of material. As predicted by the “markets as politics” perspectives, industry actors quickly sought to stabilize their supplies collectively settling on a new model in which it would reorient itself around alternative mortgage markets.

Reporting one month later on discussions at the American Securitization Forum, the trade journal *Asset Securitization Report* noted that mortgage supply remained the “hot topic”, but also noted

the generally “harmonious agreement” amongst analysts from the major banks that the largely untapped nonconventional markets could offer a solution to the supply crunch:

> “In order to maintain origination volume, analysts said they have seen the innovations from the prime sector being implemented down in credit. But not to worry, the strengthening economy should offset the risks associated with the lower-credit borrower, they said. Expect lenders to move down in credit, particularly in a growth period," said JPMorgan Securities research head Chris Flanagan. Citing a product that has raised red flags recently, Flanagan added, "IO [interest-only mortgages] are a revolutionary product and will help fuel mortgage ABS growth." Despite fears over the potential impact of the rising interest rate environment, these new mortgage products should allow borrowers to remain performing on their loans. "Lower payments equal better credit," Flanagan said. (Asset Securitization Review p.10 June 14, 2004).”

One of the leading firms in the industry, Countrywide Financial successfully made the move from prime to nonconventional mortgages. In an interview in the National Mortgage News, the CEO of Countrywide argued:

> “Countrywide’s well balanced business model continues to produce strong operational results amidst a transitional environment. Compared to a year ago, the total mortgage origination market is smaller as a result of lower refinance volume. This impact has been mitigated by Countrywide’s dramatic growth in purchase funding and record volumes of adjustable rate, home equity, and nonconventional loans. The nonconventional market is booming this year. Taking up the slack (as it did last year) for the big drop off in prime lending.” (March 2005).

The shift in the supply source meant that if you had a business built on mortgage originations and being able to package them into MBS, you suddenly had a big problem. Interest rates were still relatively low and there still existed a large demand for MBS. But the only way to take advantage of this demand was to enter the nonconventional market. One other important aspect of the structure of the market was that, the GSE were forbidden from entering the nonconventional market. This meant that the expansion of the nonconventional market was not just the answer to the supply crunch, it also meant that all of the fees for underwriting mortgages in these markets would go to private underwriters. Figure 3 shows how these underwriters moved dramatically into the nonconventional market from 2003-2008.

It is now possible to make more sense of what the investment banks were trying to do. They were the ones who were best positioned to take advantage of the nonconventional market. They would

act as underwriters for bonds, find customers for those bonds at home and around the world, and use the low interest rates to profit from those bonds themselves. This strategy explains why the investment banks were aggressive on two fronts. First, they sought out mortgage originators in order to assure themselves of mortgage supply. Second, they got the government to give them permission to expand their holdings of MBS by relaxing the rule governing how much capital they had to hold against their debt. In 2004, the investments banks made an aggressive bet that they would make billions and billions of dollars in profit by pushing hard to expand the nonconventional market.

There is one last piece to our story. If the investment banks and the commercial banks understood that they were now entering the risky business of issuing MBS for nonconventional mortgages, why did they hold onto those mortgages? Given there was a substantial market for those MBS, why not do as many have thought they did and pass the risk onto someone else? The simple answer is that all financial investors realized that nonconventional mortgages had higher returns than prime mortgages. Several of the products that were pushed most aggressively during the nonconventional boom were guaranteed to raise profits for vertically integrated banks. Many nonconventional loans were made to people with high adjustable rates that would re-set thereby guaranteeing higher payments. Many borrowers were pushed into nonconventional loans because of low documentation standards which also pushed up the interest rates and fees they were charged. Finally, there was a rapid increase in interest only loans whereby borrowers would only pay interest on their loans leaving them in the position where they would have to re-finance their loans relatively soon. This meant both higher interest rates and a guarantee that there would be a re-financing down the road (for documentation on these points see Joint Economic Committee of Congress, 2008).

At these hearings, Kurt Eggert, a law professor testified:

"I think we've had a presentation of the secondary market as mere passive, you know, purchasers of loans, but it's really the originators who decide the loan. But if you talk to people on the origination side, they'll tell you the complete opposite. They'll say, you know, our underwriting criteria are set by

the secondary market. They tell us what kind of loans they want to buy. They tell us what underwriting criteria to use. And that's what we do because we are selling to them."

William Dallas, CEO of bankrupt mortgage seller Ownit told the New York Times:

"Merrill Lynch told me we should offer more low documentation loans in which the borrower's income is not verified. They wanted these loans because they could make more money off of them. They told me that if we did not provide these loans, we would forego profits." (New York Times, November 7, 2008).

Not all originators of nonconventional mortgages saw this as coercion. Indeed, finding the loans for underwriters wanted to buy made good business sense. It was common for commercial and investment banks to enter into formal agreements with originators in order to guarantee themselves a supply of mortgages. They might make loans to originators with the idea that the originators would pay back the loans by sending the mortgages onto the underwriters. They also become partially owned by commercial and investment banks. New Financial Century, one of the leading nonconventional originators, argued in its 2006 Annual Report:

"We have developed long term relationships with a variety of institutional loan buyers including Credit Suisse, Goldman Sachs, Morgan Stanley, JP Morgan Chase and others. These loan buyers regularly bid on and purchased large loan pools from us and we frequently enter into committed forward loan sale agreements with them" (SEC 10-K, p. 3).

Levin (2007) concludes:

"Why have the Wall Street firms so aggressively embraced this vertical integration strategy? The answer is to protect and leverage their returns from their mortgage underwriting and securitization desks. In fact, revenues from the fixed income divisions currently represent the largest components of the revue mix for commercial and investment banks."

Mortgage Servicing News confirmed this in an article that appeared on July 2, 2005:

"A new analysis of the industry's profitability sheds some light on why lenders are rushing into the nonconforming market: because that is where the money is. The study by the international consulting firm of Mercer Oliver Wyman, concluded that while nonconforming and home equity loans account for less than half of mortgage lending, they generate 85% of the industry's profits."

The move into the nonconventional market was caused by both a crisis and an opportunity. The crisis was the decline of the prime market for mortgages that began in 2004. The opportunity was the realization that selling, packaging, and holding onto nonconventional mortgages were likely to result in

higher returns than prime mortgages. As interest rates remained low, commercial banks and investment banks rushed into the nonconventional market. They made spectacular profits in that market until the underlying house prices began to fall in 2007. Mortgage backed securities were in high demand. Mutual funds, hedge funds, and overseas investors drove up demand for MBS by adopting the same business model as the commercial banks, the mortgage banks, and the investment banks. Borrow money for 1-2% and invest it in MBS paying 6-7%. Eventually, of course, the mortgagees of the underlying mortgages in the MBS packages began to come under pressure. First, the price of houses started to fall and second, the rates of foreclosure increased.

Turning B/C Mortgages into AAA Bonds

We have so far not produced data to evaluate the actor-network/performativity perspective and the role of MBS and CDO expansion on the mortgage crisis. This brings us to focus on the one key player out of our already complicated analysis: the ratings companies. If the mortgage securitization system was to build its continued growth in the nonconventional mortgage sector, the ratings tactics of the major players had to overcome the fact that many risk-averse institutional investors were prohibited from purchasing any securities rated below AAA (Ranieri, 1996). This meant that the riskier nonconventional mortgages had to be packaged and evaluated in such a way as for them to be rated AAA. Historically, the three ratings agencies, Moody's, Fitch, and Standard and Poor's dominated the ratings of corporate and municipal bonds. As the market for MBS heated up, the companies saw a huge opportunity for a new market. But, there was also a lot of competition between the firms and the companies that underwrote mortgage securities used that competition to shop for ratings and to hold down their costs. The "perverse incentives" perspective rightly recognizes that the ratings agencies were paid by the underwriters suggesting that they were not rating for the ultimate buyers of the MBS but their sellers. This created a natural conflict of interest between the raters and the ultimate buyers of bonds.

Frank Raiter, a former employee of Standard and Poor's reports that on March 20, 2001, he was ordered to grade an MBS that he had never seen (Bloomberg, Sept. 24, 2009). The bank underwriting the bond told Standard and Poor's that their customer wanted them to rate the bond. But they needed an answer in 24 hours. They asked Standard and Poor's to accept the rating of the other company who had rated the bond. Standard and Poor's agreed to do this and Mr. Raiter resigned shortly thereafter. While this story might have been an extreme event, it is worth quoting a report issued by Standard and Poor's bond rating procedures for MBS (and more complex bond products like CDO). "The bond rating process does not turn "straw into gold". The underlying goal is to create a capital structure with a higher credit rating than the underlying assets would qualify for without financial engineering (reported in Bloomberg, Sept. 24, 2009).

In 2004, Moody's changed its credit rating to system to both speed along the process of credit rating and allow for overall higher average ratings. Two weeks later, Standard and Poor's followed suit. (Bloomberg, Sept. 25, 2009). The main strategy they used was to incorporate more favorable assumptions into their risk models. In particular, they used the recent past as a predictor of the riskiness of the bonds. The average five year loss rate on MBS had been 1.9% compared with 6.3% to corporate bonds. This lower level of risk implied that even the riskiest nonconventional mortgages were unlikely to fail. Executives acknowledged that the two largest bond raters repeatedly eased their standards as they pursued profits from MBS deals. One investment officer, Tomko Gast of the hedge fund Dynamic Credit Partners LLC always re-engineered the raters' models before he would buy bonds. He said "The ratings agencies' models were too flawed and cut too many corners, and the raters got pressured by the bankers. That's how the race to the bottom was kind of invisible for a lot of people."

It is useful to unpack what happened in order to examine more closely the role of financial instruments in the eventual collapse of the market. It is certainly the case that the huge expansion of all kinds of MBS and securities based on other assets (called ABS) including cars, student loans, credit

cards, and large “industrial” purchases such as airliners and jet engines, occurred over this period. It is also the case that the demand for these MBS was huge given that there was capital all over the world looking for investment returns higher than government bonds. The ratings for MBS and ABS were crucial to their being sold to all kinds of clients. Structured finance expert and textbook author Sylvain Raynes nicely distills the basic logic of this strategy, "A lot of banks and insurers cannot buy anything but AAA. You're manufacturing AAA out of not AAA, therefore allowing those people who have AAA written on their forehead to buy." So, the pressure to issue more MBS and ABS was great and the pressure for these issuances to have AAA written all over them enormous.

Figure 10 chronicles the compositional shift in the initial ratings for nonconforming mortgage MBS from 2003-2007, the core years of the run up in those mortgages. Astonishingly, as the period goes on, the percentage of issues receiving a AAA rating increases from 15% to 42%. Almost 80% of the nonconforming MBS received an A rating or above. So even as the number and size of these MBS increased, their average ratings increased as well. Here we aggregate B/C, Alt-A, and HEL MBS for the sake of space, but the same common trend toward fabricating increasingly prime-grade securities from nonconventional mortgage debt was virtually identical within each of asset classes. This inflationary trend is all the more remarkable insofar as other evidence suggests that the overall creditworthiness of borrowers was moving in the opposite direction during this period (Keys et. al., 2008).

(Figure 10 about here)

One might argue that these ratings were legitimate and not built simply on the pressure on ratings agencies to deliver more and more AAA ratings. To show that unconventional MBS were increasingly overrated, one would need to examine how the ratings fared over time. A good measure of this is the number of times that a bond is downgraded. Figure 11 shows the average magnitude of

subsequent ratings downgrades by vintage of the bonds through May 2009. The graph shows that all bonds were subject to significant downgrades after the meltdown. But it shows that bonds issued in 2005-2007, the height of the nonconventional market, were particularly downgraded. A bond issued in 2006, for example, was downgraded on average 4.6 steps while a bond issued in 2004 was only downgraded 2.8 steps. Not only were bonds issued after 2004 more highly rated, but they were also clearly more overrated as evidenced by the large downgrades they took as the market deteriorated.

(Figure 11 about here)

The "actor-network/performativity" perspective argues that it was the complexity of these instruments which was ultimately the cause of their being overrated. Hypothesis 6 implies that the most complex securities ought to have been overrated the most. Figure 12 shows that the initial ratings for newly issued CDO remain remarkably stable over time. What this means is the repackaging of MBS tranches into CDO did not further contribute to ratings inflation.

(Figure 12 about here)

Figure 13 presents evidence that casts doubt on the "actor-network/performativity" hypothesis 7. It looks at the degree downgrades of various types of asset types over time. CDO, along with Whole Loan (i.e. non-conforming "jumbo") securities, actually tended to be somewhat less overrated on average than B/C, Alt-A, or HEL securities. This suggests that variations in overrating were related more to the underlying quality of the mortgage debt as opposed to the complexity of the bond structure. These results, taken together, imply that the complexity of the MBS and CDO were not a cause of their ultimate demise. Instead, the evidence supports to some support for the "perverse incentives" approach which argued that over time, there would be pressure for higher and higher ratings for MBS and CDO. The bond ratings companies came to rate nonconforming mortgages packaged into MBS and CDO at a

higher and higher rating. When the underlying mortgages on which these bonds were based started to be foreclosed, these over ratings became apparent.

(Figure 13 about here)

"Industrial" Conception of Control and Firm Death

Recognizing how the "industrial" conception of control induced a particular form of economic rationality helps illuminate the apparently self-destructive behavior of the core firms. Understanding the degree to which the mortgage securitization business was not merely about transactions and/or risky investments – but was in fact an "industrial" production enterprise – helps us to understand why the firms remained so deeply enmeshed in the business even as evidence of the market's mounting crisis began to accumulate during the first two quarters of 2007. Almost all banks persisted in the nonconventional business despite numerous counter-indications because shutting down the pipelines meant closing what had for many become the largest chunk of their business.

The "industrial" conception of control had oriented actors toward extracting maximum profit via scale growth, which required capturing raw supply, encouraged firms to aggressively conduct mergers, and measured success via standing in the league tables. The second half of 2006 augured trouble in the real estate market as housing prices started to decline, delinquency rates rose steeply, and several home-builders went out of business. Nonetheless Wall Street continued to integrate aggressively in nonconventional mortgages. During that year Bear Stearns, Deutsche Bank, Merrill Lynch, and Morgan Stanely all acquired additional non-prime originators. As Tett (2008) concludes from extensive interviews with bank executives and traders, the primary instrumental goal was to keep the securitization machines cranking. In other words, the integrated structure of the organizations actors

built to maximize their nonconventional business also locked them into the business and rendered them less responsive to signs of impending trouble.

To further test this thesis, we examine how vertical integration in nonconventional affected a firm's likelihood of subsequently dying. We specify a cross-sectional logit/probit regression(s) to test whether the firm's level of nonconventional integration (measured by number of segments circa 2007) heightens likelihood of subsequent bankruptcy. Of the thirty firms who were a top-20 player in any one of nonconventional issuance, origination, underwriting, or servicing during 2007, twenty died via bankruptcy or forced merger July 2009. The model includes controls for the firm's total volume of business in nonconventional origination, underwriting, issuance, and servicing. We also include measures of the firm's involvement in other mortgage securitization markets like Alt-A since this segment was also a source of significant writedowns. To further control for size and diversification we include dummy variables for a) whether the firm is also a major player in prime mortgage-related markets, and b) whether the firm is one of the 30 largest financial firms in the US market (Compustat total assets). Larger, more diversified firms may have more resources to weather a crisis in the nonconventional unit compared to mortgage finance specialists and/or or specifically nonconventional specialists.

Table 1 presents results of logit and probit estimations testing the effect of nonconventional vertical integration on the probability of subsequent death. The degree to which the firm is vertically integrated across nonconventional securitization markets (origination, issuance, underwriting, servicing) as of July 2007 exerts a sizeable and significant effect on the odds of subsequent death. Conditional on the *amount* of business a firm conducts in nonconventional markets, a one unit increase in integration increases the estimated ratio of the odds of dying versus the odds of surviving by a factor of fifty-four in the logit specification. The effect is statistically significant in both the logit and probit estimations despite the small number of observations (n=30). More importantly, the effect attains

independently of the magnitude of the firm's stake in each of many mortgage-related businesses. In other words, it is not simply that firms with large stakes in nonconventional markets got hit when the market collapsed, but integration across these markets significantly heightened susceptibility to death. This result -- along with the negative effect of integration on bond quality – offers some evidence that the industrialization of nonconventional securitization was as key to the field's demise as its growth. The firms' who most aggressively pursued this model were the most likely to die.

Discussion and Conclusion

Our paper provides a coherent argument about what really caused the housing bubble. In essence, the bubble was being driven by financial institutions who wanted to be vertically integrated in order to make money off of all phases of the securitization process. The "industrial" model was enormously profitable as long as house prices went up and the size of the market grew. The low interest rates of the 2000s allowed banks fuelled this model as it provided incentive to increase the supply of mortgages that were originated. The main source for those mortgages from 2001 until 2004 was the conventional mortgage market where nearly everyone who could have refinanced a mortgage did so. The demand for MBS by both American, but also foreign investors could not be satisfied by the prime mortgage market. Beginning in 2004, all of the main players in the industry shifted their attention to nonconventional mortgages. They discovered that they could package these mortgages and sell their higher returns to customers, but also hold onto to these higher returns by buying them into their own portfolio. In essence, the financial community who wanted to buy and hold MBS drove the nonconventional market where there were even higher profits to be had.

The fall was caused by the fact that at the end of the day, the underlying assets in the bonds were not really AAA and the mortgagees who owned the houses on which they were based started to default as they could no longer make payments or keep up with adjustable mortgages. Housing prices

stalled out. The industrial model of financial integration collapsed as its entire pipeline of profit making activities fell apart. The financial institutions evolved from the early 1990s until 2007 in a way that made them able to innovate and capture more and more profit making activity. They grew large, concentrated, integrated, and profitable. From the perspective of 2005, they even weathered the downturn of the conventional mortgage market. By discovering a new source of mortgages to package, they were able not only to continue making money but increase their money on each transaction because of the higher fees and interest charged to nonconventional mortgage holders. But, when the foreclosures started, they were too committed to a strategy that would no longer work. The originations stopped and the nonconventional mortgages dried up.

Our various theories about these events capture some of what happened, but miss much as well. The "financialization" of the American economy made all of this possible and indeed, made it the core profit center of the U.S. economy. But the "financialization" perspective missed the most important aspect of all of this: the vertically integrated "industrial" model of mortgages that began in the 1990s and spread to all of the major players by 2006. The "actor-network/performativity" model rightly focuses us on the bonds and their ratings. We showed that the bond ratings companies did play into the hands of the mortgage securitization industry by helping to rate bonds higher than they should have been. But, the actor network/performativity perspective overrates the importance of the complexity of the financial instruments as the source of a lack of people's understanding about what was going on. They fail to understand how people were making money: i.e. by vertically integrating back to origination of mortgages and borrowing money cheap in order to buy bonds, particularly those based on unconventional mortgages that paid out at a higher rate. The "perverse incentives" perspective accurately observes the importance of the ratings industry. But, they too underestimate the degree to which the industry was both vertically and horizontally integrated and what role that high ratings

played in the process. The "industrial" conception of control we have described and provided evidence for flies in the face of this perspective.

Finally, the "markets as politics" perspective with its focus on the organization of the industry over time and the strategies of firms proved to fit the data most closely. It alerts us to the importance of understanding what firms are doing strategically and in terms of building their organizations. It is not just interested in that firms make money, but how they make money. It also suggests the government played several key roles in the nonconventional fiasco, including the repeal of the Glass-Steagall Act, ignoring the implications of the vertical and horizontal reorganization of the industry, and finally, giving the industry all it wanted including a relaxation of the rules applying to leverage for investment banks.

There is still much work left to be done. The role of the government regulators in this process has only barely been researched. We know of some key events and actors, but we know less about what they knew and when they knew it. There were warning signs that the industry was in trouble as early as 2005, but they were ignored. It is easy to conclude that this was a case of regulatory capture of the government by the financial sector. But, the story is more complex: the regulators shared the assumptions of the sector and therefore did not just get undermined, but were willing and helpful participants.

The whole story of the evolution of the industry has barely been fleshed out here. Our understanding the way in which the mortgage market became an integrated pipeline is important but not complete. It needs to be supplemented with more detailed analysis of which financial institutions were doing what and when. We have argued that the separate markets circa 1990 became integrated by 2001. Who were the entrepreneurs who did this? Did firms move first from origination to underwriting or vice versa. There is much to study in its own right.

Finally, we know little about who the victims of the nonconventional mortgage scam were. We know some were poor people, others, middle class people priced out of local markets, and still others real estate speculators. They were also geographically centralized in a few places. The link between these people, those places, and the actions of the financial firms to find and grow those markets needs to be explored in more detail. We speculate that financial institutions who were trying to sell nonconventional mortgages systematically sought out buyers in places where prices were rising and they could take advantage of people in those places. Economists and historians have been studying the Great Depression of the 1930s on and off for the past 80 years. This is because scholars were not satisfied with the conventional wisdoms of the moment as explanations of what happened. Our paper has dispelled some myths and put forward an interpretation of how to make sense of the industry over time. We hope it stimulates more work into the economic sociology that produced the "great recession" of 2007-2009.

Appendix- Data and Methods

The data sample for the firm death analysis includes firms which were a top-20 player in any nonconventional segment during 2007. All independent variable measures are based on 2007 data. We define failures to include distressed merger-takeovers ("firesale"), bankruptcy, or equity-stake government takeovers between July 2007 and July 2009. In all these cases the firm either ceases to exist or undergoes a substantial shift in ownership. Firms which survive through government bailouts (non-equity capital infusions) or by changing their regulatory status are treated as surviving.

The effective firm-level unit of analysis is the parent financial firm. The death of a mortgage or securitization subsidiary is not treated as a death unless the financial parent firm dies as well. We do make exceptions to this rule in cases where the ultimate parent is primarily a non-financial firm. For instance, although General Motors entered bankruptcy in 2009, we do not code its surviving mortgage subsidiary, GMAC, as failing since the parent's woes were not directly related to the mortgage securities meltdown. On the other hand, the liquidation of WMC by GE is treated as a failure since it marked the failure of the firm's mortgage finance wing. (We note that the results are unaffected by these alternative coding criteria).

The positive effect of integration is generally robust to alternative specifications. We experimented with several alternative measures of diversification within the mortgage finance sector, including total number of segments and a simple dummy for whether the firm was involved in prime mortgage-related businesses in addition to nonconventional. We also experimented with probit models instead of logits. All net substantively identical results.

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Figure 1:

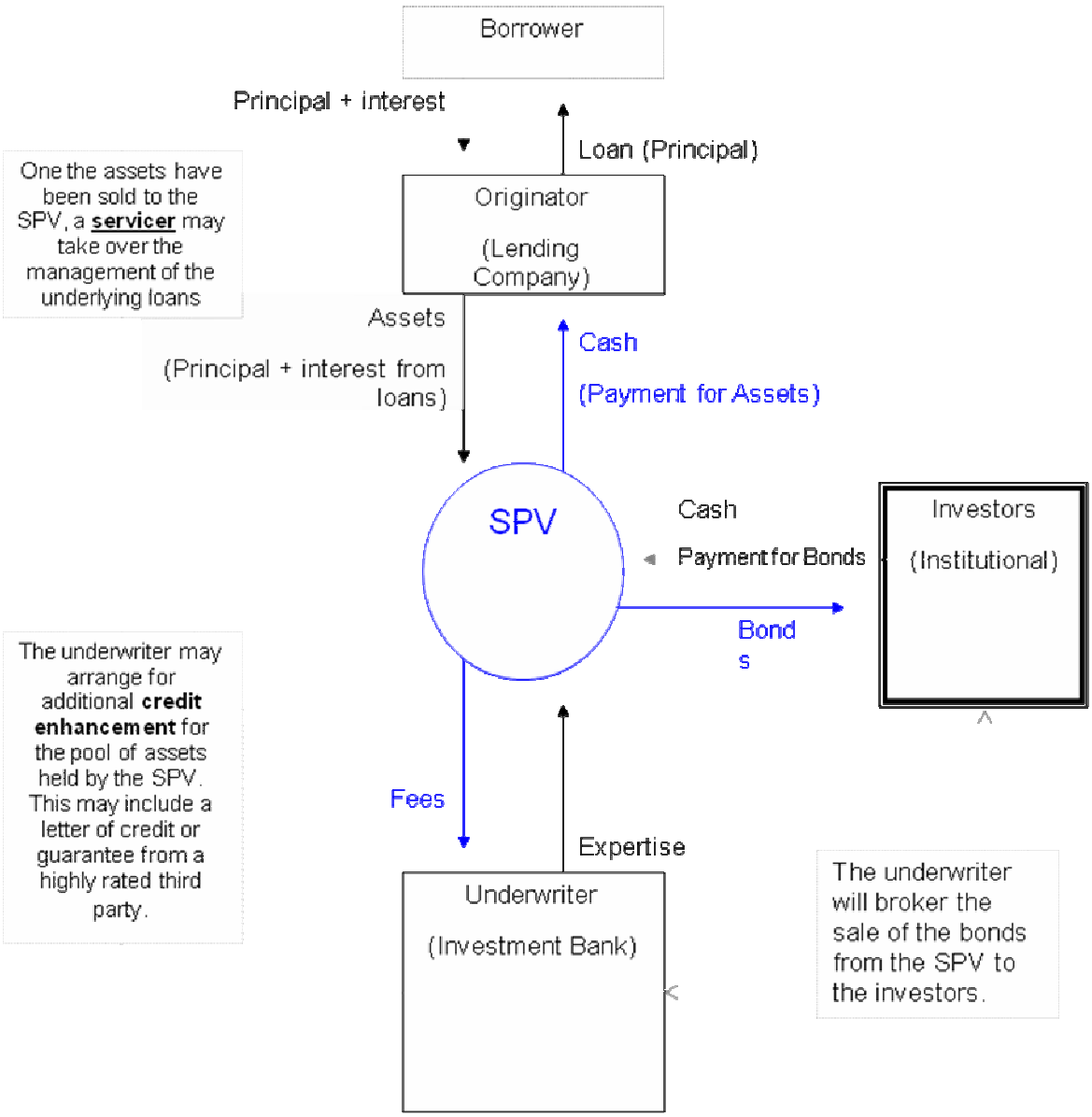
Borrower
Principal + interest
Loan (Principal)
One the assets have been sold to the SPV, a servicer may take over the management of the underlying loans
Originator
(Lending Company)
Assets
(Principal + interest from loans)
Cash
(Payment for Assets)
SPV
Cash
Payment for Bonds
Investors
(Institutional)
Bonds
The underwriter may arrange for additional credit enhancement for the pool of assets held by the SPV. This may include a letter of credit or guarantee from a highly rated third party.
Fees
Expertise
Underwriter
(Investment Bank)
The underwriter will broker the sale of the bonds from the SPV to the investors.

Figure 2:

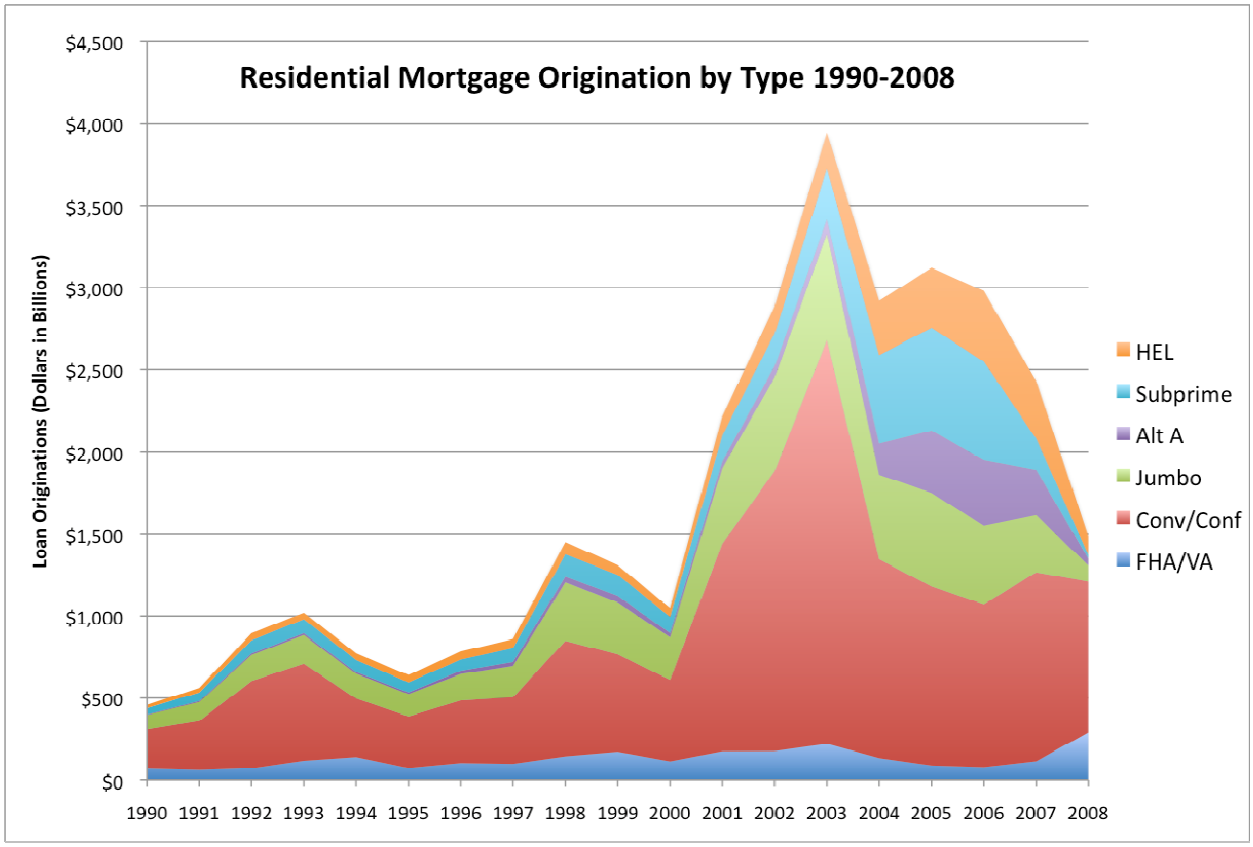
Residential Mortgage Origination by Type 1990-2008
Loan Originations (Dollars in Billions)
$4,500
$4,000
$3,500
$3,000
$2,500
$2,000
$1,500
$1,000
$500
$0
1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008
HEL
Subprime
Alt A
Jumbo
Conv/Conf
FHA/VA

Figure 3:

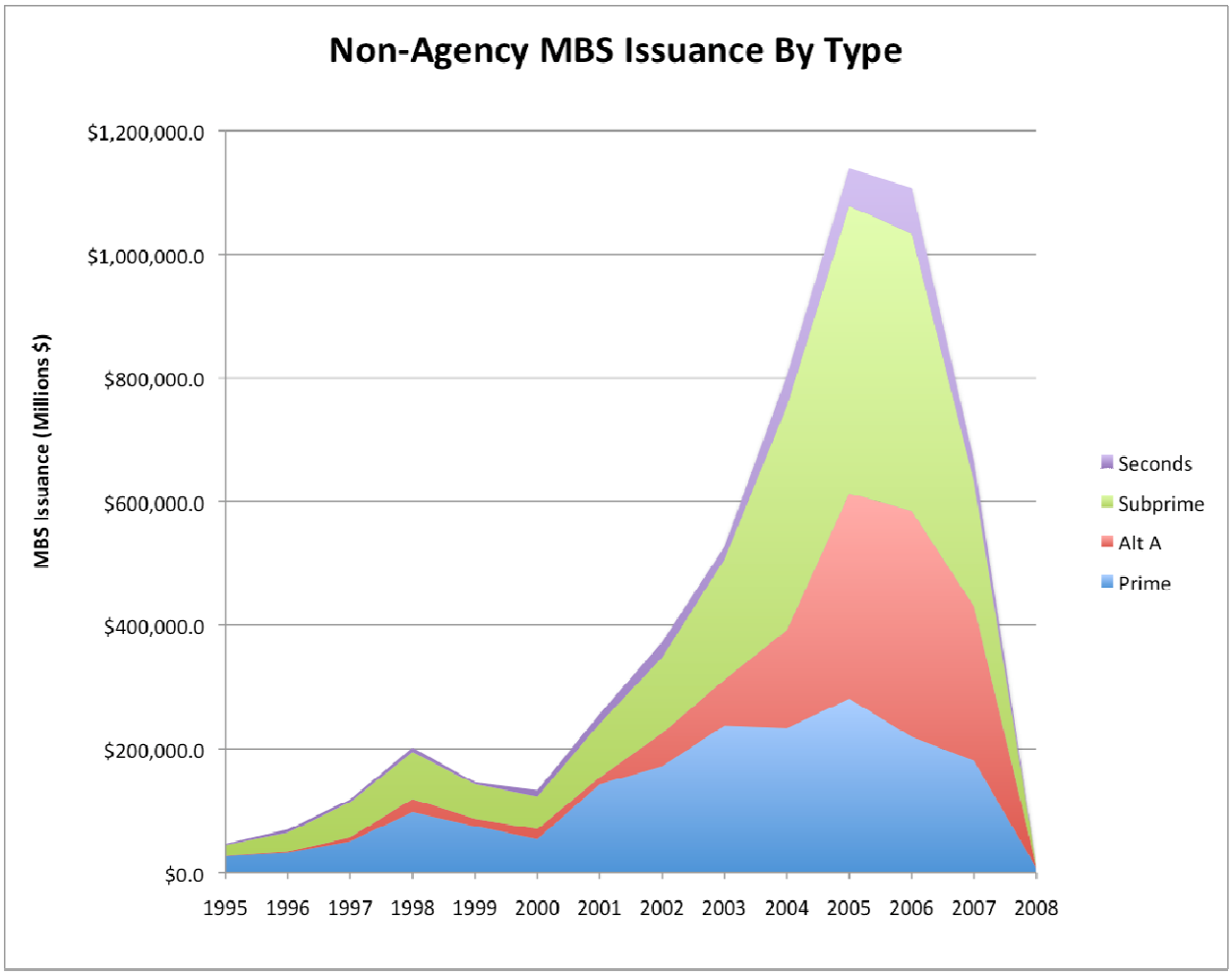
Non-Agency MBS Issuance By Type
MBS Issuance (Millions $)
$1,200,000.0
$1,000,000.0
$800,000.0
$600,000.0
$400,000.0
$200,000.0
$0.0
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
Seconds
Subprime
Alt A
Prime

Figure 4:

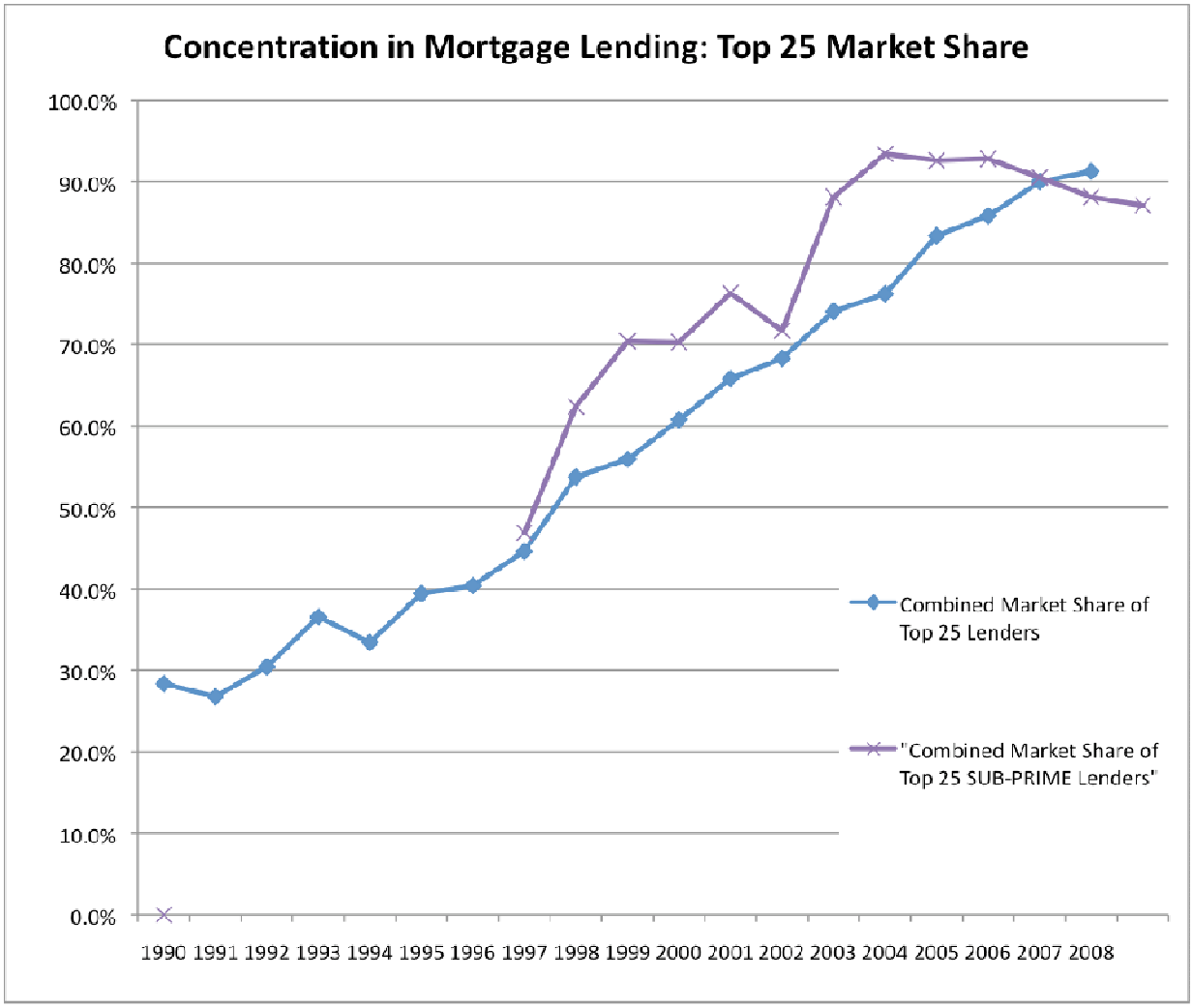
Concentration in Mortgage Lending: Top 25 Market Share
100.0%
90.0%
80.0%
70.0%
60.0%
50.0%
40.0%
30.0%
20.0%
10.0%
0.0%
1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008
Combined Market Share of Top 25 Lenders
"Combined Market Share of Top 25 SUB-PRIME Lenders"

Figure 5:

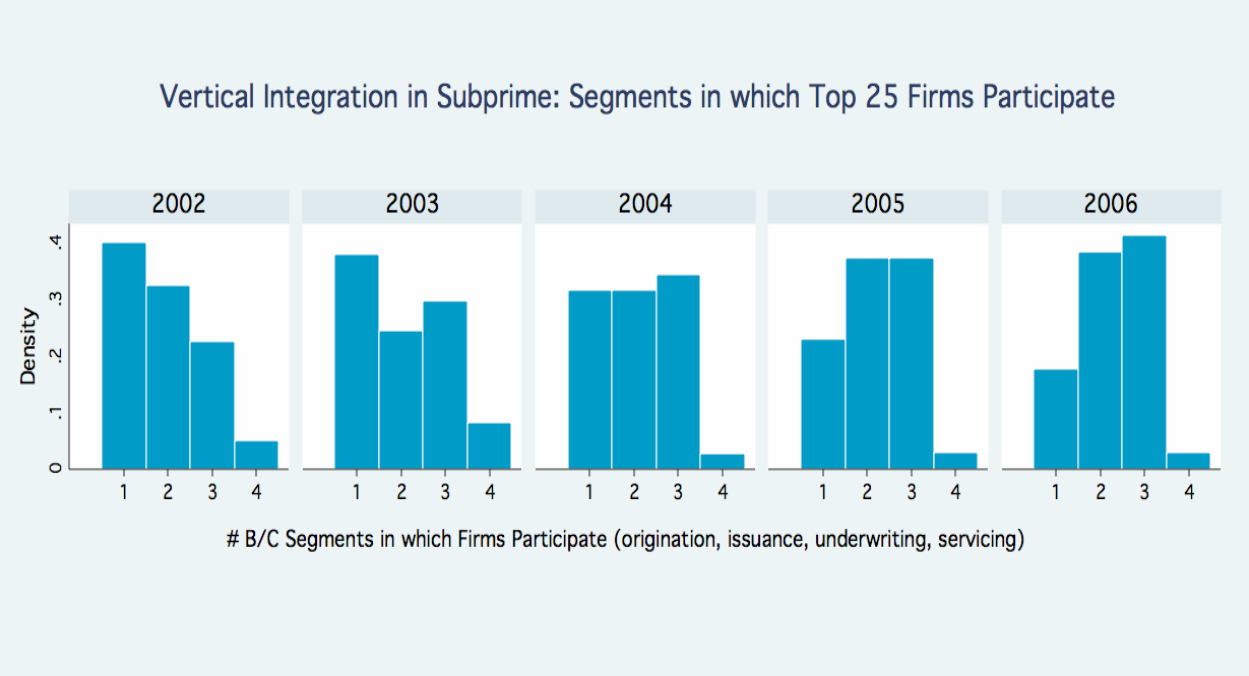
Vertical Integration in Subprime: Segments in which Top 25 Firms Participate
2002
2003
2004
2005
2006
Density
0
.1
.2
.3
.4
1
2
3
4
B/C Segments in which Firms Participate (origination, issuance, underwriting, servicing)

Figure 6:

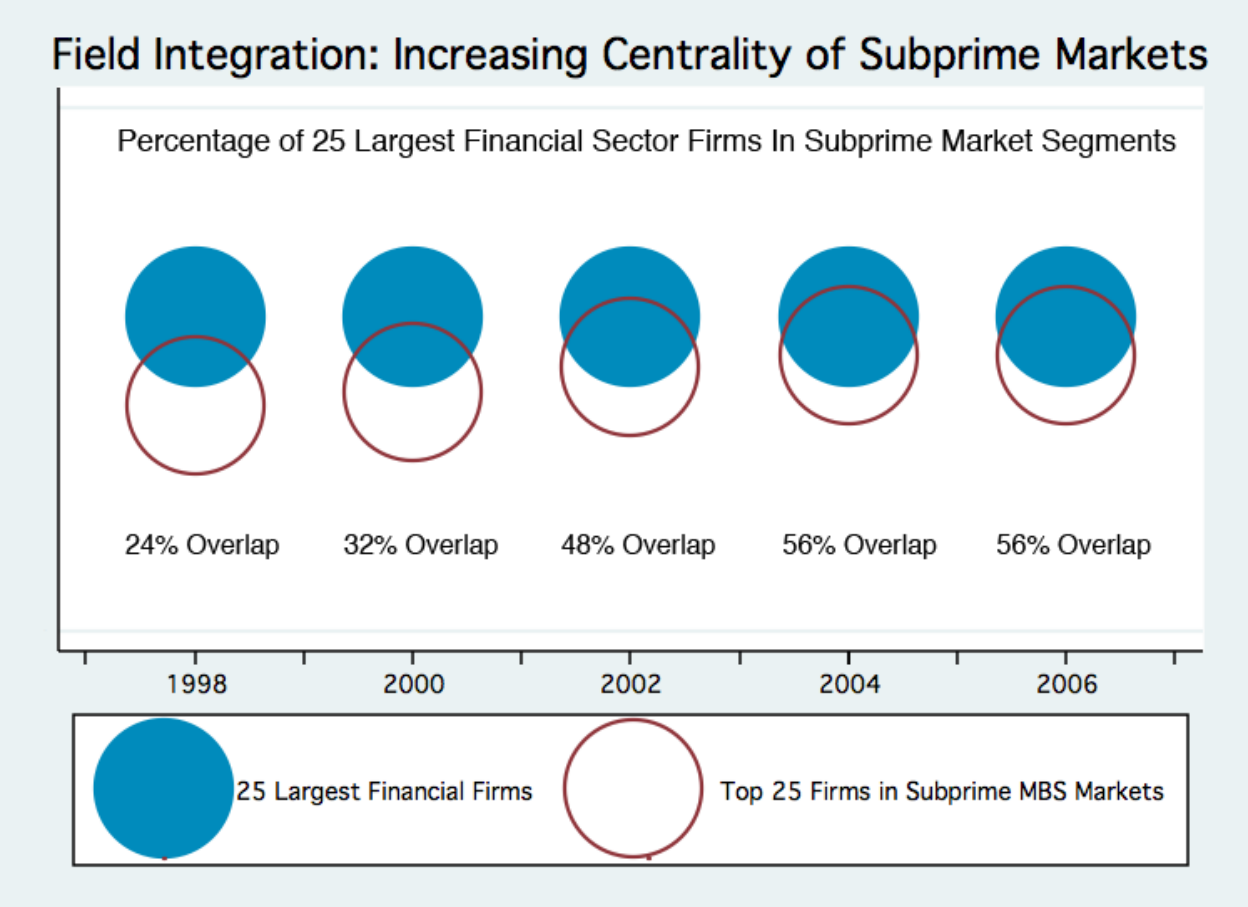
Field Integration: Increasing Centrality of Subprime Markets
Percentage of 25 Largest Financial Sector Firms In Subprime Market Segments
24% Overlap
32% Overlap
48% Overlap
56% Overlap
56% Overlap
1998
2000
2002
2004
2006
25 Largest Financial Firms
Top 25 Firms in Subprime MBS Markets

Figure 7: Top 10 Mortgage Originators and conduits in the nonconventional markets, 1996 and 2007, Source: Inside Mortgage Finance, 2009.

1996		2007	
Associates Capital	7.0	Citibank	10.2
Money Store	4.3	Household Finance	7.3
ContiMortgage	3.5	Countrywide	8.8
Beneficial Mortgage	2.8	Wells Fargo	8.0
Household Finance	2.6	1st Franklin	7.0
United Co.	2.3	Chase	6.0
Long Beach Mortgage	2.2	Option 1	5.8
Equicredit	2.1	EMC	4.1
Aames Capital	2.0	New Century	3.3
AMRESOS Capital	1.9	Washington Mutual	3.2

1996		2007	
Money Store	10.3	Merrill Lynch	10.1
United Co.	6.4	Countrywide	7.9
ContiMortgage	5.3	Morgan Stanley	7.8
Beneficial	5.0	Lehman Brothers	5.5
AMRESO	4.5	Bear Stearns	4.3
Aames	4.3	Barclays	3.4
Household Finance	4.2	Citibank	3.3
Residential Finance	4.2	Deustche Bank	3.2
Associates Mutual	4.1	Washington Mutual	2.7

Figure 8:

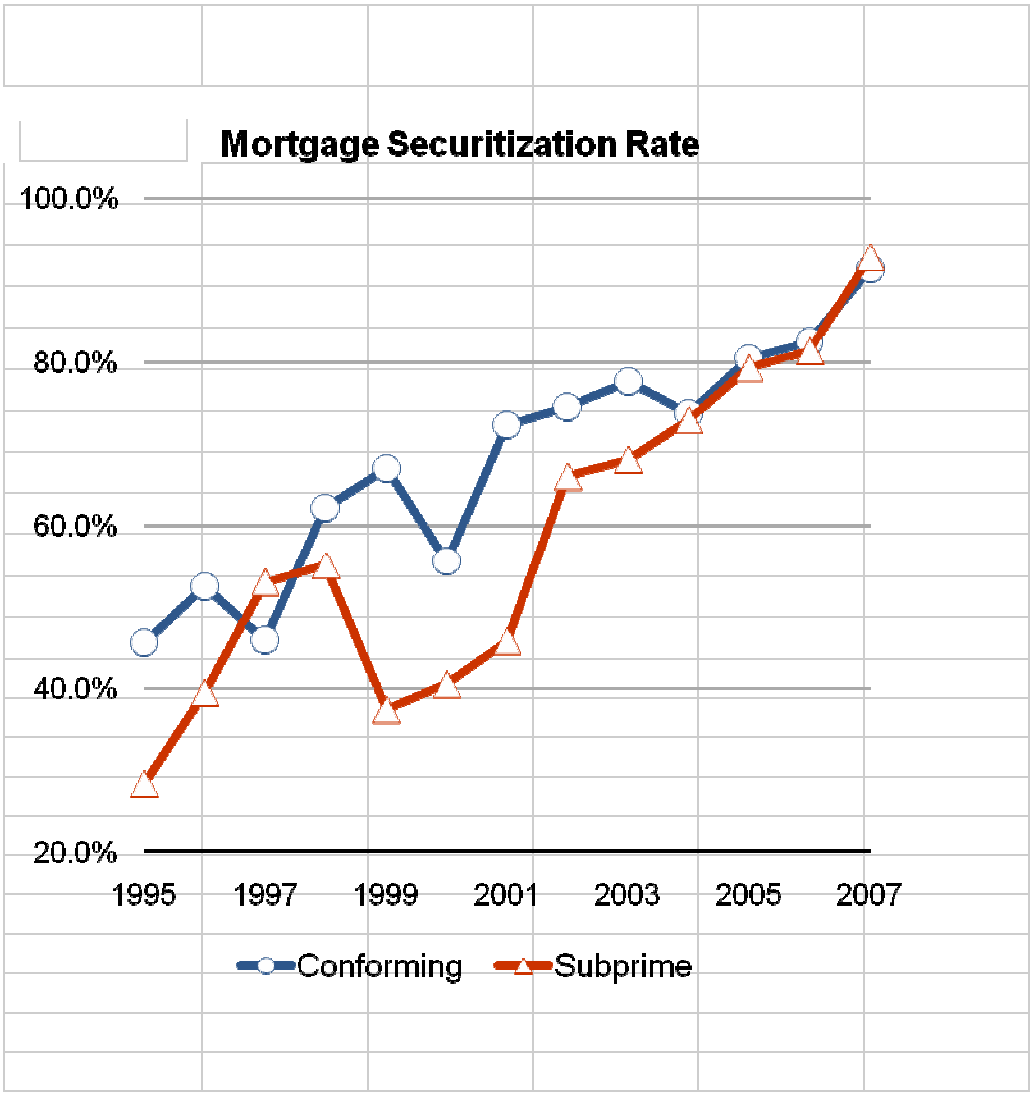
Mortgage Securitization Rate
100.0%
80.0%
60.0%
40.0%
20.0%
1995
1997
1999
2001
2003
2005
2007
Conforming
Subprime

Figure 9:

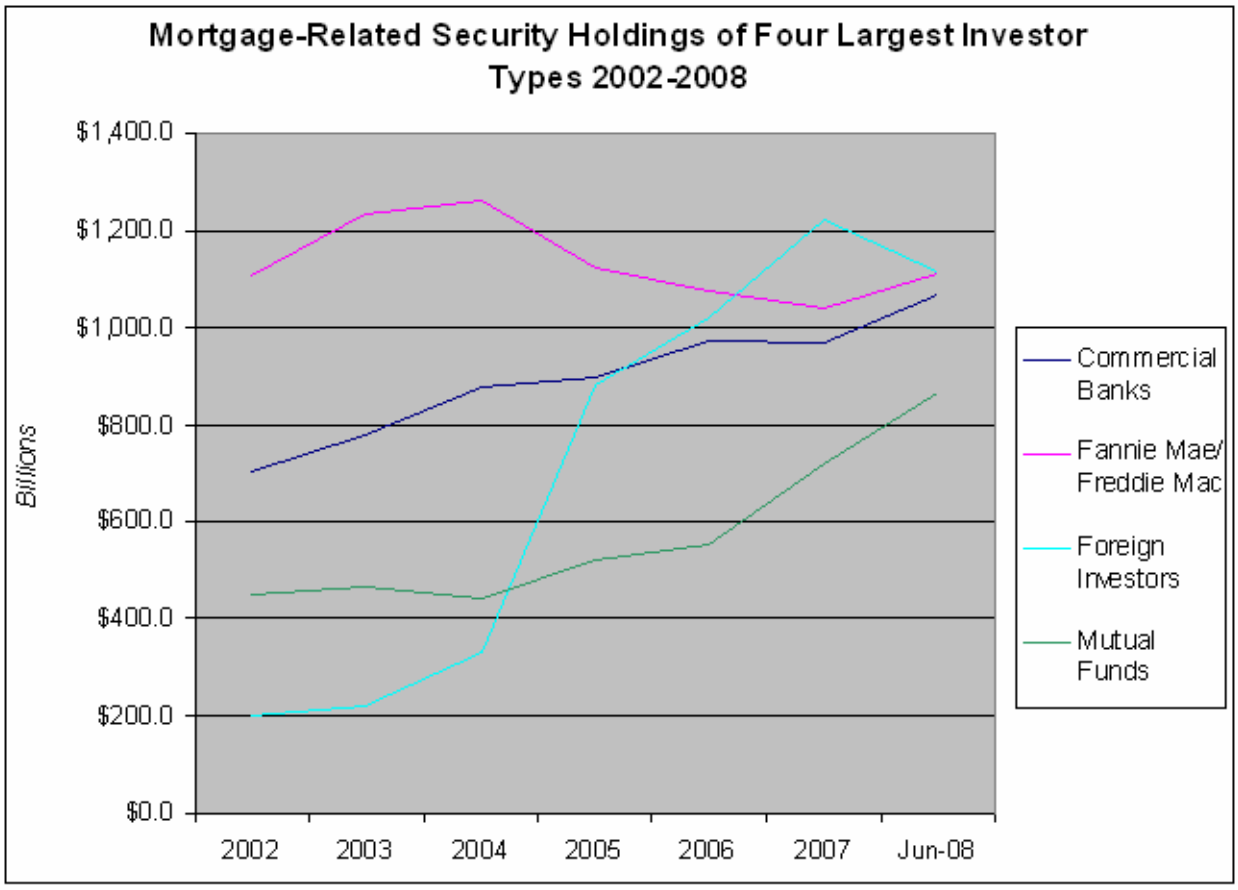
Mortgage-Related Security Holdings of Four Largest Investor Types 2002-2008
Billions
$1,400.0
$1,200.0
$1,000.0
$800.0
$600.0
$400.0
$200.0
$0.0
2002
2003
2004
2005
2006
2007
Jun-08
Commercial Banks
Fannie Mae/ Freddie Mac
Foreign Investors
Mutual Funds

Figure 10:

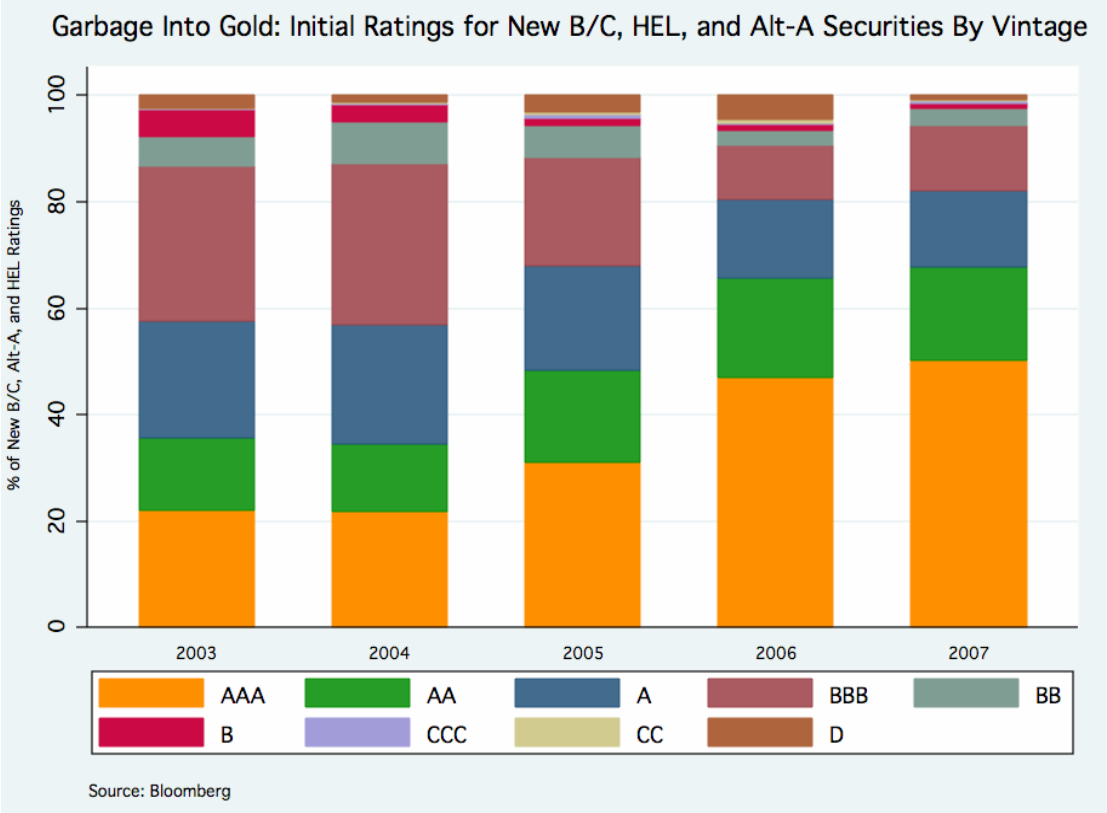
Garbage Into Gold: Initial Ratings for New B/C, HEL, and Alt-A Securities By Vintage
% of New B/C, Alt-A, and HEL Ratings
0
20
40
60
80
100
2003
2004
2005
2006
2007
AAA
AA
A
BBB
BB
B
CCC
CC
D
Source: Bloomberg

Figure 11:

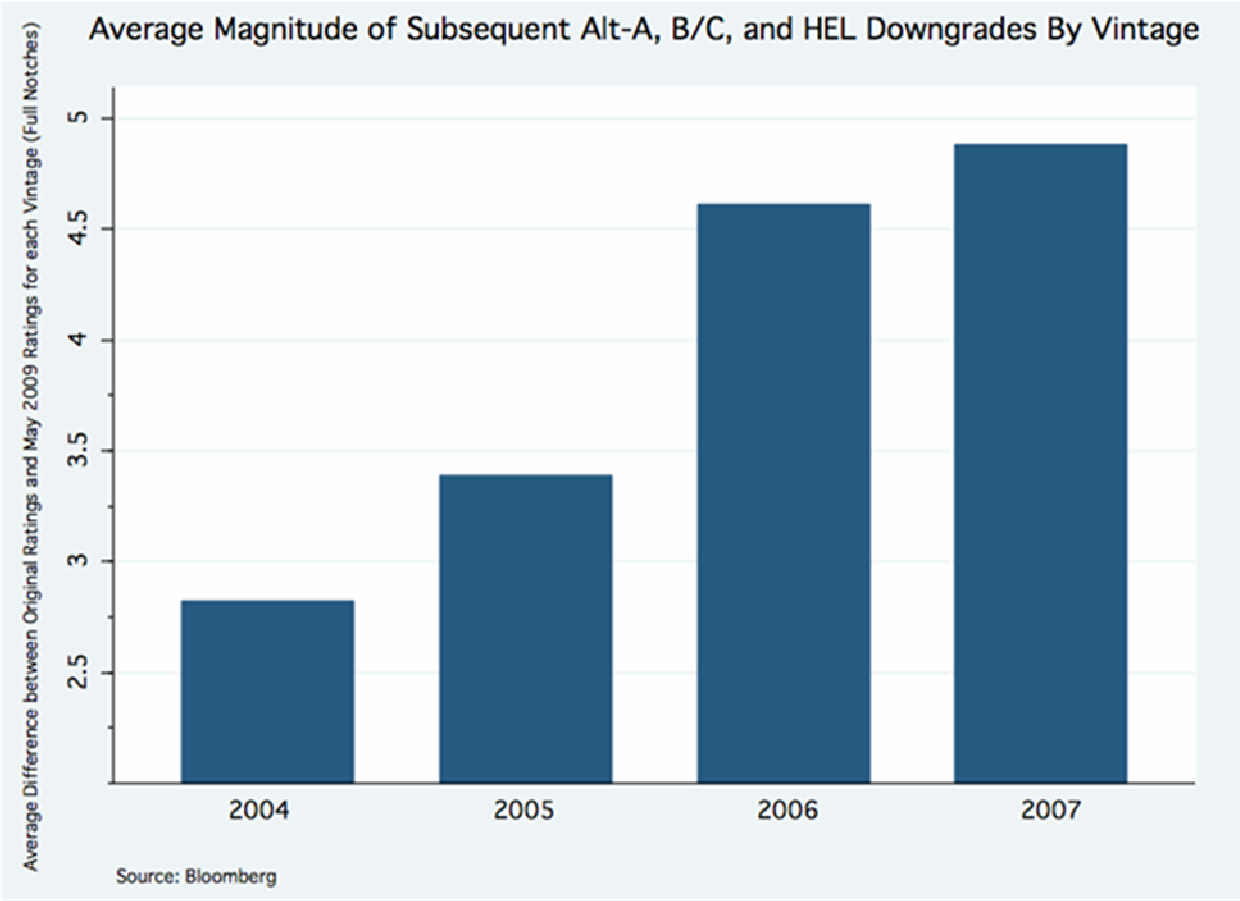
Average Magnitude of Subsequent Alt-A, B/C, and HEL Downgrades By Vintage
Average Difference between Original Ratings and May 2009 Ratings for each Vintage (Full Notches)
2.5
3
3.5
4
4.5
5
2004
2005
2006
2007
Source: Bloomberg

Figure 12:

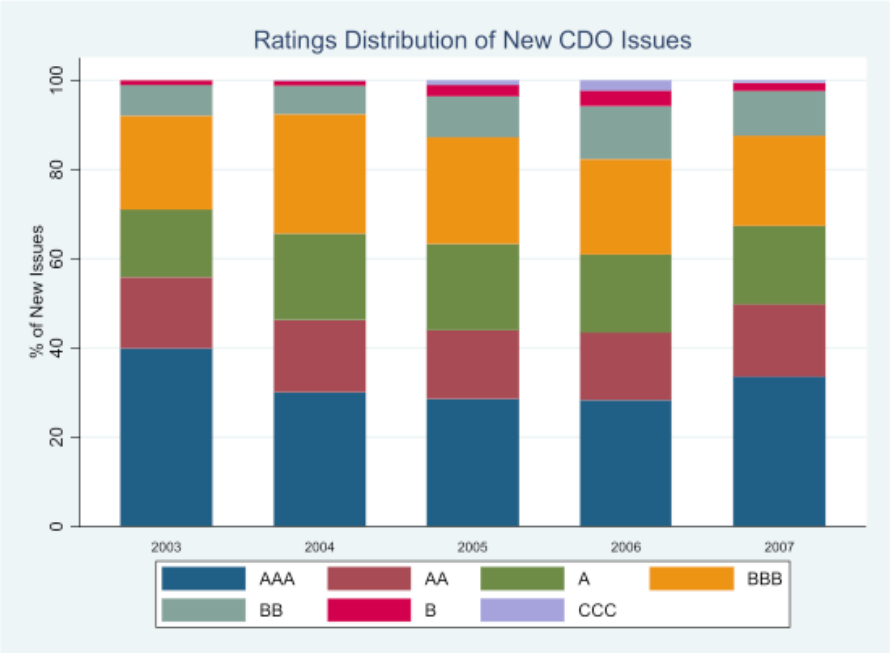
Ratings Distribution of New CDO Issues
% of New Issues
0
20
40
60
80
100
2003
2004
2005
2006
2007
AAA
AA
A
BBB
BB
B
CCC

Figure 13:

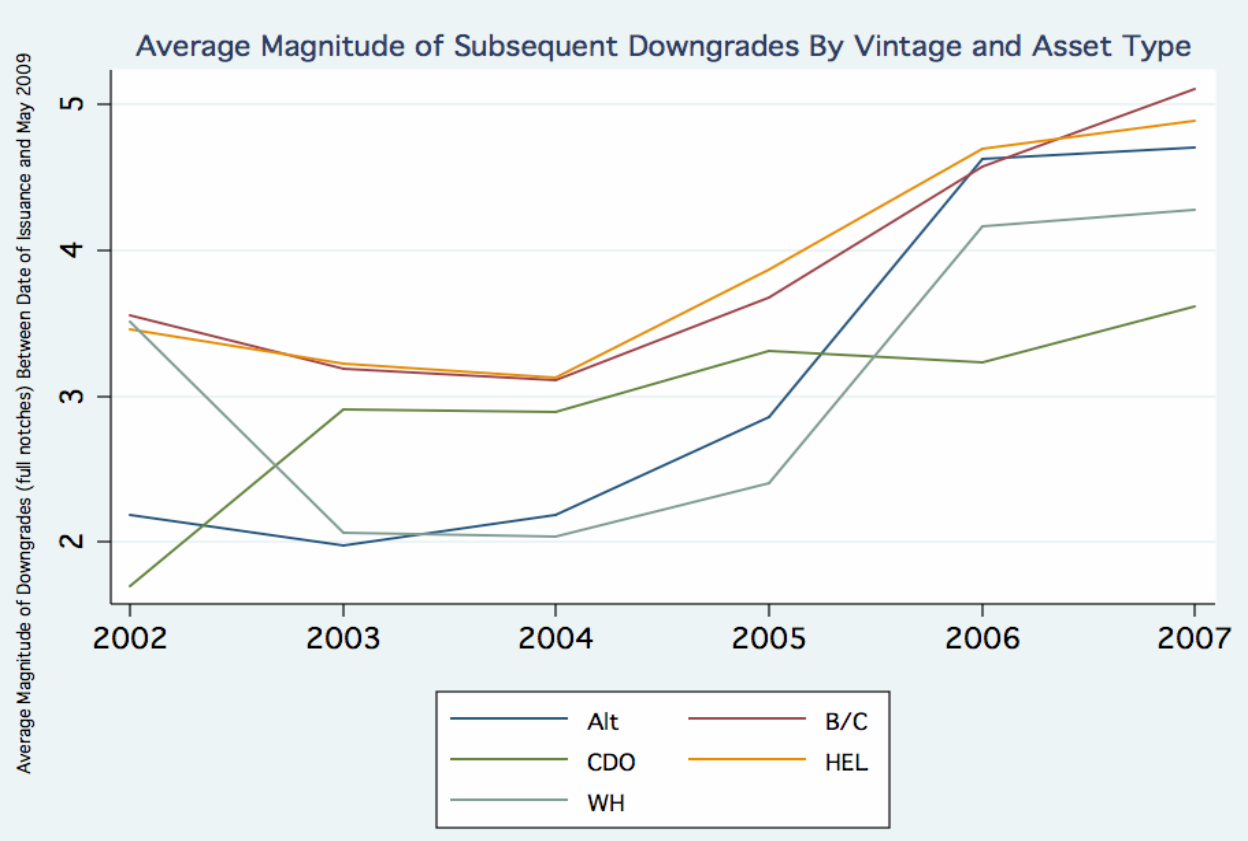
Average Magnitude of Subsequent Downgrades By Vintage and Asset Type
Average Magnitude of Downgrades (full notches) Between Date of Issuance and May 2009
2
3
4
5
2002
2003
2004
2005
2006
2007
Alt
B/C
CDO
HEL
WH

Table 1: Predictors of likelihood of bank going out of business or being taken over

Maximum Likelihood Estimates of 2-year Firm Death		
	Logit	Probit
Likelihood of Firm Death		
Vertical Integration (subprime segments)	3.990*	2.206683**
	(2.203)	(1.12816)
Subprime Issuance Volume	0.000289	0.000177
	(0.00023)	(0.00013)
Alt-A Issuance Volume	0.000124	0.000074
	(0.00016)	(0.00009)
Other MRS Issuance Volume	0.000013	0.000007
	(0.000011)	(0.00001)
Subprime Deal Underwriting Volume	-0.000170	-0.000099
	(0.00016)	(0.00009)
Subprime Origination Volume	0.000453*	0.0002731*
	(0.00027)	(0.00016)
Subprime Servicing Volume	-0.0909	-0.052703
	-0.06	(0.03264)
Prime Mortgage Sector Participant (dummy)	-7.089**	-3.998805**
	(3.313)	(1.72829)
Top 30 Financial Sector Firm (dummy)	-4.226	-2.371330
	(2.762)	(1.53861)
Constant	-5.830*	-3.361902
	(3.020)	(1.68235)
Observations	30	30
Standard errors in parentheses		
*** p<0.01, ** p<0.05, * p<0.1 (two-tailed test)		